INTERPHASE

CHART PLOTTER NAME	DESCRIPTION	SOFTWARE
CHART MASTER 169CS	*7" Sunlight Readable Color Display* *External Smart GPS Receiver*	S4egIN7wc
CHART MASTER 169CSI	*7" Sunlight Readable Color Display* *Internal GPS Receiver*	S4igIN7wc
CHART MASTER PRO	*7" Sunlight Readable Color Display* *External Smart GPS Receiver & Internal FF*	S4egIN7wc
CHART MASTER iPRO	*7" Sunlight Readable Color Display* *Internal GPS Receiver & Internal FF*	S4igIN7wc

MAX C-MAP NT

User Manual

code: (g1600-060409e)

Contents

About this User Manual

INTRODUCTION

The chart plotter is a state-of-the-art computerized electronic chart system, designed as a sophisticated navigation aid. User friendly operations make the chart plotter easy to operate. All calculations and information necessary for navigation are performed and displayed on the screen quickly and accurately providing all of the facilities of a conventional GPS but with the added benefit of a powerful electronic chart display. The cartographic information is obtained from C-CARD (cartography data cards) that are available through your local dealer.
For additional information on C-MAP By Jeppesen Cartography visit web site at **www.jeppesen.com**.

CONVENTIONS USED

Throughout this User Manual, the labelled keys are shown in capital letters enclosed in square brackets, for example [ENTER]; the software keys are shown in small capital letters enclosed in square brackets, for example [Edit].
Menu operations are in bold characters listed by keys sequence with the menu names enclosed between inverted commas, for example **[MENU] + "SETUP" + [ENTER] + "MAP" + [ENTER]** means: press the [MENU] key, using the cursor key select the SETUP menu, press the [ENTER] key, select the Map menu and then press [ENTER].

Any menu operation and function activation in this User Manual is related to all chart plotter models. Whenever it is necessary, a note has been inserted for those models with differences.

HOW THIS USER MANUAL IS ORGANIZED

- **CHAPTER 1: Overview**
  Introduction to the basic information on your chart plotter, its features and use.
- **CHAPTER 2: Getting Started**
  Overview of the controls and how to start using the chart plotter.
- **CHAPTER 3: Operations**
  Description of the operation procedures of the chart plotter in detail.
- **CHAPTER 4: User Setting Up**
  Set up of the chart plotter, the charting preferences and the GPS options.
- **CHAPTER 5: C-LINK**
  C-Link system is a feature which allows to sharing the same cartographic data between two chart plotter units linked via serial I/O port.
- **CHAPTER 6: FISH FINDER (CM PRO/CM iPRO)**
  Introduction to the basic information on the internal Fish Finder, its features and use.
- **CHAPTER 7: Maintenance**
  User maintenance guidelines.
- **CHAPTER 8: Terms**
  List of the terms and abbreviations used in the User Manual.

- **CHART MASTER 169CS/169CSi**
  Introduction to the basic information on CHART MASTER 169CS/169CSi chart plotter, its features and use. Installation of the chart plotter.
- **CHART MASTER PRO/iPRO**
  Introduction to the basic information on CHART MASTER PRO/iPRO chart plotter, its features and use. Installation of the chart plotter.
- **INSTALLING THE EXTERNAL SMART GPS**
  Introduction to the basic information on External Smart GPS Antenna and its installation.

At the end of this User Manual we have also included an Analytical Index.

IF YOU NEED ASSISTANCE

If your chart plotter does not operate properly, go to Chapter 7. Most common operating difficulties can be diagnosed using these tests.
If you still need assistance, call your local dealer, reporting the information available in the System Information page.

Important Information

WARNING

Electronic charts displayed by the chart plotter are believed to be accurate and reliable, but they are not intended to replace official charts which should remain your main reference for all the matters related to the execution of a safe navigation. For this reason we would like to remind you that you are required to carry on board and use the officially published and approved nautical charts.

WARRANTY STATEMENT

Interphase Technologies, Inc. warrants this unit to be free from defects in material and workmanship. During the warranty period, Interphase Technologies, Inc. will repair or replace any component which fails in normal use without charges for parts or labor. To receive warranty service, the unit must be returned to a Interphase Technologies, Inc. Authorized Warranty Service Centre, freight charges prepaid along with a copy of the original retail purchase receipt. This warranty is in lieu of all other warranties either expressed or implied.

This warranty does not apply to an Interphase product that has failed due to improper installation, misuse, or accident, nor does it apply to products which have been repaired or altered outside the Interphase factory.

Any costs incurred with transducer replacement are specifically excluded from this warranty other than the cost of the transducer itself.

THIS IS THE ONLY WARRANTY. INTERPHASE TECHNOLOGIES, INC. EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES INCLUDING WARRANTIES OF SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL INTERPHASE TECHNOLOGIES, INC. NAVIGATION SYSTEMS LTD. BE LIABLE FOR CONSEQUENTIAL DAMAGES OR LOSS OF USE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS WHICH MAY VARY FROM STATE TO STATE.

CAUTION

- Please read through this manual before the first operation. If you have any questions, please contact the Company's customer service or your local dealer.
- The chart plotter is not built water proof. Please give attention to avoid water intrusion into the chart plotter. Water damage is not covered by the warranty.
- Extensive exposure to heat may result in damage to the chart plotter.
- Connection to the power source with reversed polarity will damage the chart plotter severely. This damage is not covered by the warranty.
- The chart plotter contains dangerous high voltage circuits which only experienced technicians MUST handle.
- The C-MAP By Jeppesen C-CARDs are available from your local dealer.
- Exposure of the display to UV rays may shorten the life of the liquid crystals used in your plotter. This limitation is due to the current technology of the LCD displays.

- Avoid overheating which may cause loss of contrast and, in extreme cases, a darkening of the screen. Problems which occur from overheating are reversible when temperature decreases.

WARNING ON SERIAL PORTS CONNECTION

Please be aware that the serial ports are not opto-isolated and then the external device is electrically connected to the chart plotter. This allows the connection of high speed devices, like Radar or Fish Finder. If you are connecting a NMEA0183 device and you would like to isolate it from the chart plotter, you have to add the opto-isolator externally.

CLEANING PROCEDURE FOR THE PLOTTER SCREEN

Cleaning your chart plotter screen is a very important operation and must be done carefully. Since the surface is covered by an antireflective coating, the procedure for cleaning all the surfaces can be performed in the following way. You use a tissue or lens tissue and a cleaning spray containing Isopropanol (a normal spray cleaner sold for the PC screen, for example PolaClear by Polaroid). Fold the tissue or lens tissue into a triangular shape, moisten the tip and use the index finger behind a corner to move the tissue across the surface, in overlapping side to side strokes. If the tissue is too wet, a noticeable wet film will be left in its path and you will need to repeat the process. If too dry, the tissue won't glide easily, and may damage the surface.

NOTE *We will not be liable for errors contained herein, or for incidental or consequential damages in connection with the performance or use of this material.*

1. Overview

1.1 CHART PLOTTER

Cursor Key	: in the display screen moves the cursor quickly and accurately in the menu page(s) scrolls the desired option in Home mode, allows to exit from Home mode
POWER	: turns On/Off the chart plotter adjusts the backlight and contrast of the display
MOB	: activates the MOB (Man OverBoard)
PAGE	: selects the screen configuration you wish
CLEAR	: if you are into a menu, exits from menu or leaves a menu without making changes
ENTER	: if you are in chart page, places Marks, Waypoints and selects Range/Bearing if you are into a menu, confirms selection
HOME	: sets Home (Navigate) mode: the cursor is centered on ship's position
GOTO	: places the Destination (Target or Goto) and activates the navigation to it
MENU	: opens the menu on the top of the page
ZOOM IN	: increases the chart scale and zooms in on your display
ZOOM OUT	: decreases the scale and shows a wider view
Software Keys	: have different functions according to the modes of operation: their labels for the current functions, located on the front panel, are shown on the screen right above the keys.

1.2 C-MAP BY JEPPESEN MAX CARTOGRAPHY INFORMATION

MAX is a major evolution of the product technology. Key points are:

Data Features

- **ISO Certification** *(electronic chart production process with quality certification)*
- **Extra Large Coverage** *(all the C-MAP BY JEPPESEN electronic chart detail and a huge coverage without having to change cartridge)*
- **Official data source** *(data based on use of official data sources)*
- **Detailed World Background** *(worldwide background chart with details)*
- **Depths & Land Elevation** *(color shading of sea depth and land altitude for improved chart reading)*
- **Bathymetric & Spot Soundings** *(additional Data Base with depth and bathy information for an extraordinary view of the seabed depth)*
- **Detailed Port Plan** *(complete port and marina charts with detail)*
- **Search & Find** *(quickly locates chart contents and objects)*
- **Tides Preview** *(dynamic simulation of tides)*
- **Dynamic Currents** *(current arrows dynamically display direction and speed)*
- **Dynamic Nav-Aids** *(displays Nav-Aids in true color and with real interval lighting)*
- **Port Info** *(all the information of the available services in the ports and how to contact them)*
- **Enhanced Port Info & Roads** *(details of the available facilities and services in ports and surrounding areas)*
- **Object Info** *(indicates restricted area details and related information)*
- **Quick Info** *(full information on objects, buoys, wrecks, shoals and Nav-Aids)*

- **Photos & Diagrams** *(high definition pictures of ports, piers, bridge diagrams and nav-aids)*
- **Multilanguage Support** *(displays charts in the local character set)*
- **True-Type Font** *(improves text on chart for optimal reading)*

Presentation Features

- **Clear View** *(advanced legibility techniques providing more chart data on the screen)*
- **Clear Info** *(sophisticated "Human Dictionary" to translate Nav-Aid abbreviations found on paper charts)*
- **Dynamic Nav-Aids** *(an innovative and dynamic presentation mode)*
- **Flexi-Zoom** *(increased Under and Over Zoom between chart levels, resulting in optimal scale display for any situation)*
- **Dynamic Elevation Data** *(optimized palettes including the NOAA color palette)*
- **Perspective View** *("Real World" perspective view of the chart, updated real-time during navigation)*
- **Smooth-Zoom** *(smooth transition of cartographic levels)*
- **Enhanced Turbo-Zoom** *(extra fast cartography level change displaying the most important cartographic objects)*
- **Enhanced Mixing Levels** *(seamless data presentation)*
- **Off-line redraw** *(cartography level transition without image construction)*

Cartographic Data related Features

- **Guardian Alarm** *(automatic control and alarm over obstacles on charts in front of your boat)*
- **Safety Toolbar** *(interactive alarm system for situational awareness on screen)*
- **Safety Route Check** *(sophisticated function checking dangerous objects along your navigation route)*

MAX and NT / NT$^+$ C-CARD coexistence

- When NT$^+$ data and MAX data cover different areas, the chart plotter gets data from both charts (depending on the current position).
- When NT$^+$ data and MAX data cover the same area, the chart plotter gets data only from MAX chart.

1.3 GPS

For centuries, sailors have been searching for a reliable and precise method of travelling the world's waterways. From celestial navigating to the modern navigation techniques as Loran, Decca Navigator, Omega or Transit Satnav, each system has had its problems with weather, range and reliability. Without doubt, the *"Global Positioning System",* or GPS for short, is the most significant advance in navigation: it gives the navigator a position 24 hours a day, 365 days a year in any weather condition.
GPS is a satellite based navigation system which provides suitably equipped users with accurate position, velocity and time data.
Originally the GPS, developed by the U.S. Department of Defence, was conceived for military purposes, but now it is used in a host of civilian applications. To safeguard military operations, the U.S. Department of Defence introduced an artificial error, "*Selective Availability*" (SA), which causes a random position error

up to 100m (GPS has a natural precision of 15 meters).
GPS navigation uses satellite signals to determine your position in relation to a set of satellites orbiting the earth. The GPS constellation of satellites continuously send radio signals, containing the precise position for each satellite back to earth. By knowing the position of 3 or 4 satellites and calculating various time differences between transmitted signals, the GPS receiver can determine its present position anywhere on earth, and thanks to continuous updates, calculate speed and course information.

How GPS works

Currently, the GPS constellation consists of 26 orbiting satellites (including 3 spares), but this number will increase in the future.
The GPS receiver computes an accurate position by calculating the distance to the GPS satellites that orbit the earth. Signals are required from 3 satellites for two dimensional (2D) position calculation whilst 4 satellites are required for three dimensional (3D) position calculation.
As mentioned earlier, GPS satellites are not geostationary, but they are orbiting the earth as illustrated on the following figure:

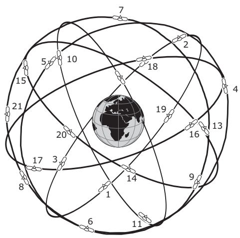


Fig. 1.3 - The GPS constellation

Note that position is repeatedly fixed through the following three steps while any 3 satellites are in line of sight.
The position calculation procedure is indicated in the following three steps:

1. GPS satellites continuously transmit their own precise orbital data and the GPS receiver computes their locations by receiving this data.
2. In this receiving process, the GPS receiver measures very accurate distances to the satellites, using the "Spread Spectrum Modulation" method. Excellence in GPS's position-fixing accuracy is mainly due to this technology.
3. When the satellite locations and their distances are known, the GPS receiver fixes its own position by triangulation:

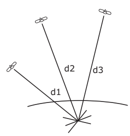


Fig. 1.3a - The GPS position calculation

As illustrated in the previous figure, the position is calculated as the meeting point of three spheres which are drawn around the three satellites with diameters d1, d2 and d3.

Position Fixing Accuracy: HDOP

The GPS fix accuracy is due to the locations of 3 satellites in the sky. High accu-

racy is obtainable when the satellites are widely scattered in the sky; on the contrary, accuracy is reduced when the satellites have gathered in a narrow space. In the following figure, in both cases it is possible to obtain the GPS fix, but in the left case the accuracy will be higher than the right:

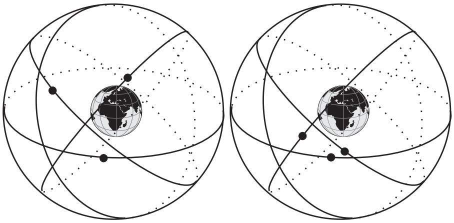


Fig. 1.3b - HDOP

The index for position-fixing accuracy is called HDOP (*"Horizontal Dilution Of Precision"*, see also Chapter 7 for the HDOP definition).
The HDOP value indicates higher position accuracy. Ranges of 1.0 to 1.2 provide the highest degree of accuracy. Higher values indicate less position accuracy. This is due to the satellites being gathered in a narrow space. Satellites which are widely scattered in the sky produce the highest degree of accuracy.

2. Getting Started

This chapter provides basic information to get you started using the chart plotter; it will help you in becoming familiar with the chart display and the functions of the controls before you start using the chart plotter.

2.1 SWITCHING ON/OFF

Before powering On the chart plotter, check for the correct voltage (10-35 volt dc) and the correct connections with the positioning instrument.

Switching On

- **[PWR] for 1 second**

The chart plotter shows you the logo screen, Caution Notice and then the chart screen in sequence. The chart plotter will then perform a short self test procedure that checks all internal memory and the C-CARD (if installed), and then displays any failure detected on the screen.

Switching Off

- **[PWR] for 3 seconds**

A countdown timer appears on the screen, if you release the key before the countdown timer reaches zero, the chart plotter will remain On.

2.2 CHANGING BACKLIGHT AND CONTRAST

You can change the level of backlight and contrast for the screen.

- **[PWR] + move the cursor left/right to adjust backlight levels and/or move the cursor up/down to adjust contrast levels + [CONFIRM]**

Now you return to the chart screen with the new backlight and contrast levels retained.

2.3 SELECTING THE USER INTERFACE LANGUAGE

It is possible to set the language to display menus, data pages, warning/alarm messages, full/quick info, list of objects found by find/nearest function, and on charts (such as place's names, buoy's names and so on).
To select the language you want:

- **[MENU] + "SETUP" + [ENTER'] + "Language" + [ENTER] + select the language you want + [ENTER]**

NOTE *If the selected language is not available on cartographic data, English language is used instead.*

CAUTION

*If you have accidentally selected an incomprehensible language, and you don't be able to reselect your language (the above procedure is not of help to you), follow this procedure: press **[MENU]**, move the cursor to the right until the last selection is highlighted (which corresponds to the Setup menu) and press **[ENTER]**. Then a window appears with "Language" message, press **[ENTER];** now select your language and press **[ENTER]** again. Anyway if you in trouble, see Chapter 6 "Maintenance" for a RAM Clear operation: the chart plotter will also return all selections, in particular language, to original default values.*

2.4 USING C-MAP BY JEPPESEN C-CARDS

The chart plotter has a built-in world map that can be used for Route planning. To use the chart plotter as a navigation aid, charts with detailed information for the area you wish to navigate are required. This chart cartridge is called C-CARD.

NOTE *During normal operations the C-CARD should not be removed since the chart plotter may lock up.*

2.5 SIMULATION MODE

The built-in Simulator function allows you to become proficient in the use of the chart plotter. It simulates the reception of the navigation data (Lat/Lon, Course, Speed, date, time). The simulated ship's position is placed at the current cursor position by the time the simulation is activated. To start the Simulator:

➤ **Place the cursor at your desired position + [MENU] + "MENU" + [ENTER] + "SIMULATION" + [ENTER] + "SIMULATION MODE" + [ENTER] + "ON" + [ENTER]**

You might insert the Speed, Course, date and time values:

➤ **[MENU] + "MENU" + [ENTER] + "SIMULATION" + [ENTER] + "COURSE"/ "SPEED"/"DATE"/"TIME" + [ENTER] + enter values + [ENTER]**

To select the Cursor Control in Chart page use the cursor up/down to adjust the Speed and the cursor left/right to adjust the Course:

➤ **[MENU] + "MENU" + [ENTER] + "SIMULATION" + [ENTER] + "CURSOR CONTROL" + [ENTER] + "ON" + [ENTER]**

2.6 CONTROLLING THE DISPLAY

This paragraph describes how to change the display mode and how to move around the chart by changing the chart scale.

Changing Display Mode

➤ **[PAGE] + move the cursor up/down + [ENTER]**

The selected page appears on the screen.

NOTE *If the Fish Finder or Radar is connected, other displaying pages are available too.*

NOTE *See the following table for help to understand the GPS Signal Status page:*

COLOR	STATUS	SNR	ELEVATION
GREEN	*Tracked - In Use*	*> 40*	*<= 45°*
GREEN	*Tracked - In Use*	*> 40*	*> 45°*
GREEN	*Tracked - In Use*	*< 40*	*<= 45°*
ORANGE	*Tracked - In Use*	*<= 40*	*> 45°*
RED	*Tracked - Not In Use*	*- -*	*- -*
GRAY	*Not Tracked*	*- -*	*- -*

Chart Full

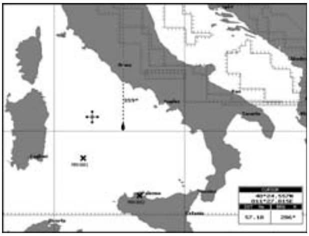
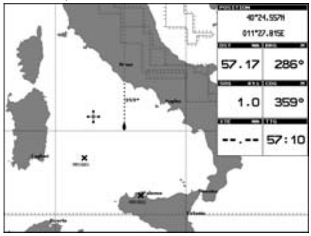
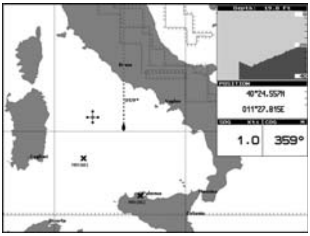


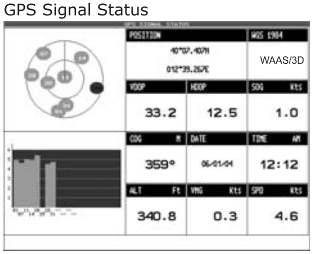
Chart Split



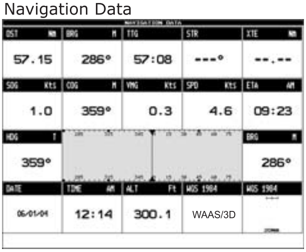
Chart/Depth Split



GPS Signal Status



Navigation Data



3D Runway Display

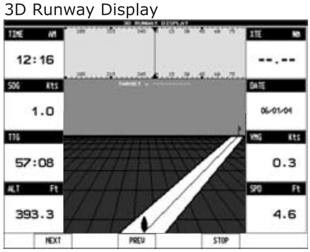


Fig. 2.6 - Available chart and data pages

Moving around the Chart and Changing Chart Scale

Use the cursor key to move around the chart. Also use [ZOOM +] and [ZOOM -] to change the chart scale so that a smaller or larger area is shown on the chart. Now it is possible to change smoothly the zoom level avoiding the big jump between levels.

Finding Your Boat Position

The most common use of the chart plotter is to show your ship's current location. You can home the cursor to the ship using [HOME]. The Home function locks the cursor to the ship and updates the display as the ship moves.
To release the cursor from the Home Mode, use the cursor key to move the cursor away from the ship's current position.

Selecting Look Ahead

In Home mode the Look Ahead function sets up the charts on the navigation direction (course) in order to display more map details in front of the vessel's position.

- **[HOME] + [MENU] + "SETUP" + [ENTER] + "GENERAL DISPLAY" + [ENTER] + "LOOK AHEAD" + [ENTER] + "ON" + [ENTER]**

Selecting Map Orientation

To select the orientation of your chart according to:

- **From the Chart page, [MENU] + "MENU" + [ENTER] + "MAP ORIENTATION" + [ENTER]**

The available choices are North Up, the map is shown with North upwards, and Track Up, the map is shown with the ship's current heading upwards. The Resolution angle can be set:

- **[MENU] + "SETUP" + [ENTER] + "GENERAL DISPLAY" + [ENTER] + "ORIENT. RESOLUTION" + [ENTER] + use cursor to insert values + [ENTER]**

The Resolution angle, which may be selected in the range [5 – 60] degrees, defines the maximum variation of the reference angle after which the map changes its orientation.

2.7 NAVIGATION TO A SINGLE DESTINATION

To place the destination at cursor coordinates and activates navigation to it:

- **Place the cursor on location to navigate to + [GOTO] + "CURSOR" + [ENTER]**

You are now navigating to the destination drawn as a Mark with a circle around it, labelled "DEST". A straight line is shown on the screen connecting the destination with the ship's position. All navigation data is referred to this destination.

2.8 RANGE/BEARING FUNCTION

The Range/Bearing function allows to measure the distance and bearing between two points on the Chart page.
It also finds a point on the map knowing the starting point and the distance and bearing from the starting point. You enter manually the distance and bearing from the origin and saves a Mark to the position found.
In both cases, the circle and the line are always removed once the function is finished.

The starting point is the cursor or a ship's position (if you are in Home mode).
The ending point can be selected using the cursor or it can be calculated entering the Range and Bearing values from the starting point.

Selecting Ending point with cursor

- **Move the cursor to the starting point or press [HOME] + [ENTER] + "RANGE/BEARING" + [ENTER] + move the cursor to select your ending point**

A window containing the distance and bearing values between the starting point and the ending point is shown. Bearing Line and Variable Range Marker are displayed until you press [ENTER] to add a Mark at the ending point or press [CLEAR] to exit.

Selecting Ending point by entering Range & Bearing

- **Move the cursor to the starting point or press [HOME] + [ENTER] + "RANGE/BEARING" + [ENTER] + [ENTER] + enter distance and bearing values by using the cursor**

Pressing [ENTER] a Mark appears on the ending point.

2.9 MAN OVERBOARD (MOB)

If a person or object is lost overboard and you need to return to the location, use the MOB (Man OverBoard) function.
To activate the MOB function, a valid GPS fix must be available.

Inserting MOB

- **[MOB] + [CONFIRM]**

If MOB is already placed:

- **[MOB] + [NEW] + [CONFIRM]**

removes the existing MOB and places a new one.
Once inserted, the system performs the following operations:

1. places the MOB icon at ship's position
2. stops navigation to an existing destination (if present)
3. sets the MOB as destination

Selecting Auto Info on MOB

- **Place the cursor on MOB symbol**

An information window appears, showing the bearing and distance to the MOB position.

Deleting MOB

- **[MOB] + "DELETE"**

3. Operations

3.1 USER POINTS: MARKS AND WAYPOINTS

A User Point is an object that you can place on the charts to mark a specific point. The max number of User Points is 500. The chart plotter features two types of User Points: Marks and Waypoints. A Waypoint is created entering a Route while a Mark can be created at anytime.

Creating Waypoint

See Creating a Route.

Creating Mark

- **[ENTER] + "MARK" + [ENTER]**

The new Mark appears on your cursor or ship's position if in Home Mode.

Editing User Point

To allow to modify symbol, name, color and position of the User Point.

From the Chart page:

- **Place the cursor on the desired User Point + [EDIT] + use the cursor key to modify Symbol/Name/Color/Lat-Lon + [CLEAR]**

From the User Points List page:

- **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + use the cursor to select the desired User Point + [ENTER] + use the cursor key to change Symbol/Name/Color/Lat-Lon + [CLEAR]**

The User Point appears on the screen with the new Symbol/Name/Color/Lat-Lon.

NOTE *To select the User Point presentation:*

- **[MENU] + "SETUP" + [ENTER] + "GENERAL DISPLAY" + [ENTER] + "USER POINTS" + [ENTER]**

There are three possible choices: selecting Hidden the User Point is not shown on the screen, otherwise selecting Visible it appears on the Chart page shown with symbol and name; selecting Icon only the User Point symbol is shown.

Deleting User Point

From Chart page:

- **Place the cursor on the desired User Point + [DELETE] + [CONFIRM]**

From the User Points List page:

- **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + use the cursor to select the row with the desired User Point + [DELETE] + [SELECTED] + [CONFIRM]**

The User Point is deleted.

It is also possible to delete all stored User Points. From the User Points List page:

- **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + [DELETE] + [ALL] + [CONFIRM]**

Moving User Point

- **Place the cursor on the desired User Point + [MOVE] + move the cursor to the desired position + [ENTER]**

The User Point is placed on the screen at the new position.

Locating User Point on Map

From the Chart page:

- **[MENU] + "FIND" + [ENTER] + "USER POINTS" + [ENTER] + use the cursor to insert name of the User Point to show on map + [ENTER]**

From the User Points List page:

➤ **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + use the cursor to select the row with the desired User Point + [LOCATE]**

The User Points List is closed and the map is centered on the selected User Point.

Sending / Receiving User Point

To send all User Points to an external device through the serial port:

➤ **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + [SEND / REC] + [ENTER] + [SEND]**

To read User Points from the NMEA input port:

➤ **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + [SEND / REC] + [ENTER] + [RECEIVE]**

Selecting User Points List page

To give information and allow the editing of all stored User Points:

➤ **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER]**

From this page it is possible to find the User Point in the page by entering its name:

➤ **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + [SEARCH] + [ENTER] + use the cursor to insert name + [ENTER]**

It is possible also to sort all User Points present in the page by Icon type, choosing one of the 16 available icons or all:

➤ **[MENU] + "MENU" + [ENTER] + "USER POINTS LIST" + [ENTER] + [ICON] + [SELECT] / [ALL]**

NOTE *It is not possible to edit/remove/move a Waypoint if it belongs to the active Route.*

3.2 ROUTES

A Route is made by placing a series of Waypoints or by linking existing Marks. Among the available Routes only one can be the Active Route, that is shown on the screen by straight lines and arrows to indicate the direction; the first Waypoint of this Route is surrounded by a circle. The Active Route (sometimes called current) is the working Route: it can be edited by adding, removing or moving Waypoints.

Selecting Active Route

From the Route menu:

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "SELECT" + [ENTER] + use the cursor key to highlight the Route + [ENTER]**

From the Route Data Report page:

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "REPORT" + [ENTER] + [SELECT] + use the cursor key to highlight the Route + [ENTER]**

The Route, shown by straight segments, is centered on the screen, with the cursor on the central Waypoint. This will then allow you to quickly work out which Route you have selected.

When you want to create a new Route, select an open Route position in the list using the above procedure.

Creating a Route

To create a new Route:

➤ **Place the cursor + [ENTER] + "WAYPOINT" + [ENTER]**

This places the first Waypoint of the new Route on your cursor position. If a Mark is present under the cursor position, the Mark is linked to the Route. To place the next Waypoints of the Route repeat the above procedure.

The following functions work on the Active Route.

Selecting Route Color

To select Route legs color among the eight available colors:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "COLOR" + [ENTER]**

The Route is drawn on the screen in the selected color. It is possible to select a different color for any Route.

Deleting Route

From the Route menu:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "DELETE" + [ENTER] + [CONFIRM]**

From the Chart:

- **Place the cursor on existing Waypoint or on Route leg + [DEL RTE] + [CONFIRM]**

The Route legs and Waypoints are deleted. The Marks linked to the Route are not deleted. If the destination is placed on the Route, that Route cannot be deleted.

Following a Route (Activate the Navigation)

With the Route shown on the Chart page, move the cursor to the starting Waypoint in the Route and press [GOTO]. The destination is placed on the Waypoint of the selected Route and you are now navigating to it.

Inserting Waypoint

To insert a new Waypoint between two existing ones:

- **Place the cursor on the desired Route leg + [INSERT] + move the cursor to the new position + [ENTER]**

The new Waypoint is placed.

To append a new Waypoint to the last Waypoint of the Route:

- **Place the cursor + [ENTER] + "WAYPOINT" + [ENTER]**

Reversing Route

To allow a return Route to be generated from an existing Route.

From the Route menu:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "REVERSE" + [ENTER]**

From the Route Data Report page:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "REPORT" + [ENTER] + [INVERT]**

The Route is then followed in reverse order, with Waypoints renumbered accordingly. If the destination is placed on the Route, that Route cannot be reversed.

Selecting Route Report page

To give information on Waypoints belonging to the selected Route:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "REPORT" + [ENTER]**

From this page it is possible to modify the Speed and Fuel consumption values:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "REPORT" + [ENTER] + [SPEED] / [FUEL] + use the cursor to insert values + [ENTER]**

Locating Route on Map

To show the current Route on the map.

From the Route Data Report page:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "REPORT" + [ENTER] + [LOCATE]**

The Route Report page is closed and the chart is centered over the first Waypoint of the selected Route.

Sending Route

To transmit the Active Route information onto the NMEA output port.

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "SEND" + [ENTER]**

The NMEA WPL & RTE messages are sent to the output port.

Receiving Route

To save Route information received from the NMEA input port.

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "RECEIVE" + [ENTER]**

The received route is saved on the Active route, overwriting it. The NMEA WPL & RTE messages are sent to the input port.

Safe Route Checking

This function checks the presence of particular cartographic objects (see the list below) on a range set by the user for all Route legs:

- Land Areas
- Shallow Water
- Intertidal Areas
- Rocks
- Wrecks
- Obstructions
- Shoreline Constructions
- Fishing Facility
- Dredged Areas
- Diffusers
- Mooring/Warping Facility
- Production Installation
- Pingos
- No Data Available

If any of these alarm conditions is detected, then the chart plotter highlights the list of dangerous objects and the correspondant dangerous Route leg. The Route leg is then drawn in a different color.

To activate this function:

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "AUTOMATIC CHECK" + [ENTER]**

NOTE *If Automatic Check is activated, the modified Route legs are checked everytime a Waypoint is added, inserted, edited or moved.*

To select the width of the detected area aside the Route:

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "ROUTE WIDTH" + [ENTER] + insert the desired value + [ENTER]**

NOTE *Safe Route width value represents half the total width checked by the function.*

To select the depth of the detected area aside the Route:

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "ROUTE DEPTH" + [ENTER] + insert the desired value + [ENTER]**

It also possible to select the accuracy for the Route check, among Minimum, Low, Medium, High and Maximum:

➤ **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "ACCURACY" + [ENTER] + insert the desired value + [ENTER]**

The list of the dangerous objects found on the charts crossed by the Route is shown in the Route check report, follow the procedure:

- **[MENU] + "MENU" + [ENTER] +"ROUTE" + [ENTER] + "ROUTE CHECK REPORT" + [ENTER] + insert the desired value + [ENTER]**

3.3 GOTO FUNCTION

This functions allows you to place the destination point and immediately start navigating to it.

Goto Cursor

- **Place the cursor on the desired location + [GOTO] + "CURSOR" + [ENTER]**

The destination is placed at the cursor position and you are now navigating to it. It is a temporary User Point that will be removed when the navigation is stopped. If the fix is received, the destination is placed on the desired location, otherwise a warning message is shown. If the destination is already placed, it is possible to remove the existing destination and place a new one on the cursor position.

Goto Mark on the Chart page

- **Place the cursor on any existing Mark + [GOTO]**

Goto Mark using the User Points List

- **[GOTO] + "MARK" + [ENTER] + select the desired User Point + [GOTO]**

Goto Route using the Select Route menu

- **[GOTO] + "ROUTE" + [ENTER] + select one of the existing Routes + [ENTER] / [GOTO]**

The destination is placed on the first Waypoint of the selected route and then the Route Following function is activated.

Stopping Navigation

If the destination has been placed, to remove it:

- **[GOTO] + [DELETE]**

otherwise, to remove the current destination and place a new one at cursor position:

- **Place the cursor on location to navigate to + [GOTO] + [NEW] + [ENTER]**

3.4 USING TRACK

A very useful feature of the chart plotter, is the ability to store and display exactly where the boat has been. This feature, referred to as Tracking, can provide invaluable information about the effect of tide and wind influence on the boat's progress as well as giving an indication of the helmsman's performance.
When this limit has been reached, the oldest points are deleted and overwritten by the newest ones.

Setting up a Track Step

Before you use the Track function, it is important to specify the Track step unit: if you select Distance, the Track point is placed when the distance from its last stored position is greater than the defined distance; if Time, the Track point is placed after the defined time.

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "STEP UNIT" + [ENTER] + "DISTANCE" / "TIME" + [ENTER]**

You can select the Track step Time [1 sec - 10 min] or distance [0.01 - 10.0] Nm. Setting a short time/distance interval between Track points is best suited to navi-

gate within a close or complex environment, a greater time/distance interval is best suited to a long voyage.
To select the interval at which the Track points are placed. If you have selected Distance:

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "DISTANCE" + [ENTER]**

If you have selected Time:

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "TIME" + [ENTER]**

Selecting Track Color

To select among 8 different lines color that you choose for the Track:

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "LINE COLOR" + [ENTER]**

The same Track can be saved with any color.

Displaying Track

To enable or disable the Track displaying on the map screen:

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "VISIBLE" + [ENTER] + "ON"/"OFF" + [ENTER]**

Activating/Deactivating Track Recording

To activate or deactivate the Tracking of the vessel while the vessel is moving:

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "TRACKING" + [ENTER] + "ON"/"OFF" + [ENTER]**

Clearing All Tracks

All the Tracks can be cleared from the screen:

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "DELETE" + [ENTER] + [CONFIRM]**

Selecting Track Number

The chart plotter has the capability to store up to 5 Tracks. To select a Track:

- **[MENU] + "MENU" + [ENTER] + "TRACK" + [ENTER] + "ACTIVE TRACK" + [ENTER] + use the cursor key to select the number + [ENTER]**

3.5 DATA WINDOW CUSTOMIZATION ON PAGES

You can choose the information shown on the data windows. To edit fields shown in every screen configuration:

- **[MENU] hold for 1 second + use the cursor key to select data window to customize + [ENTER] + use the cursor key to choose selection + [ENTER]**

Press [CLEAR] to exit the edit mode.

3.6 INFO

Placing the cursor on cartographic objects the information related to the object nearby is shown.

Setting Automatic Info

Automatic Info allows you to get the information on any cartographic object just placing the cursor on it. You can select the type of it:

- **[MENU] + "SETUP" + [ENTER] + "GENERAL DISPLAY" + [ENTER] + "AUTO INFO" + [ENTER]**

The possible settings are **Off** (no automatic info shown at all), **On Points** (only on points e.g. Rocks, Buoys, Lights, Tide Stations) and **On All** (on all objects, points, lines and areas).

NOTE *Choosing "On All" the Automatic Info will be shown most of the times the cursor is moved.*

Selecting Automatic Info

- **Move the cursor on the object**

The pop-up window with the basic info of the objects is displayed. To get full details of the object press [EXPAND].

Displaying Expanded Info page (Full Info)

To show the Expanded Info page:

- **Place the cursor on objects + [MENU] + "MENU" + [ENTER] + "INFO" + [ENTER]**

Info Tree and Expanded Info page

The upper side of the page contains the Info Tree and the Lower side contains the expanded information. While moving the cursor through the Info Tree, all the relevant information of the selected object is shown on the lower part of the page. Pressing [CLEAR] the page is closed. If the information shown on the Lower part of the page exceeds the page size, you may scroll the page using [Page Dn]. Use [Home] to get back to the first page. When the selected object is a Tide Station, pressing [ENTER] the Tide page is shown.

Info on objects with Pictures

To get the information on objects with pictures.

- **Move the cursor on the object**

On the Quick Info, there will be the camera icon on the top bar of the window if at least one of the objects found has one or more pictures associated.

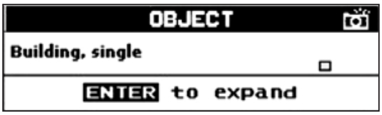


Fig. 3.6 - Example of Quick Info on objects with picture

On the Full Info, there will be the small camera icon on a corner of the square containing the object icon or a big photo icon centered on the square for the object without icon.

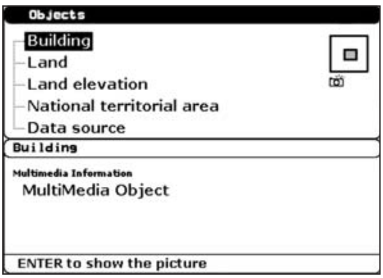


Fig. 3.6a - Example of Full Info on objects with picture

To see pictures:

- **Press [ENTER] when the object with a picture is highlighted**

To change size

- **Press [ENTER] when the picture is shown.**

Quick Info on Lakes

Upon viewing the chart of a lake, you will click on to query the available information immediately displayed with many details. For example, see the following picture:

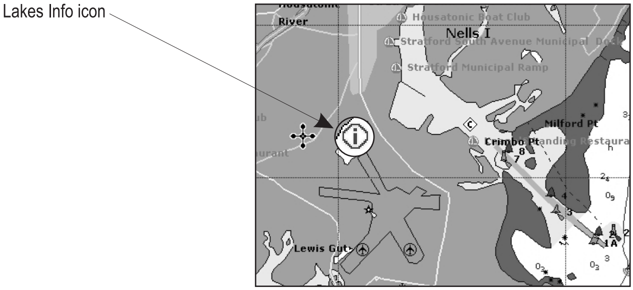


Fig. 3.6b - Example of Lakes info

When the cursor is placed over the icon, the icons of the available services are shown:

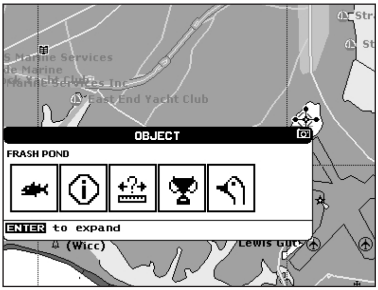


Fig. 3.6c - Quick Info: available services

If you press [ENTER] all available information about the cartographic point under the cursor will be shown. See the next paragraph.

Full Info on Lakes

The following is an example of Full Info on Lakes:

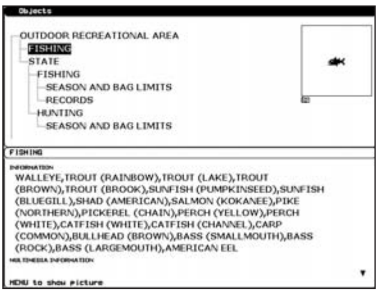


Fig. 3.6d - Example of Full Info page

To see the "Fishing" object press [MENU] (when the "Fishing" object is high-lighted). On the screen appears:

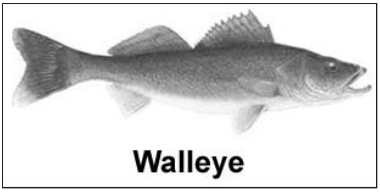


Fig. 3.6e - Example of picture associated to the Fishing object

3.7 PORT & TIDE INFO

Getting Port Info

The object Port Marina contains the information about the services available on the selected Port Marina and the area around it. To get info on Port Marinas, move the cursor on the Port Info icon. The available information is shown in the Automatic Info window where icons of the available services are shown:

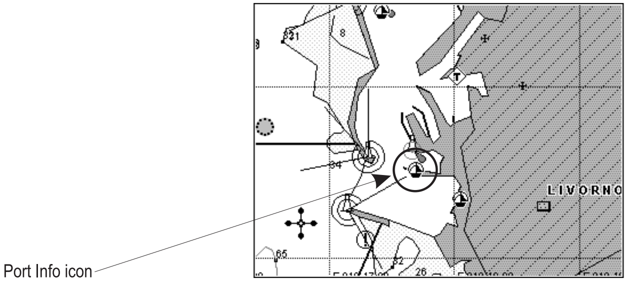


Fig.3.7 - Port Info icon

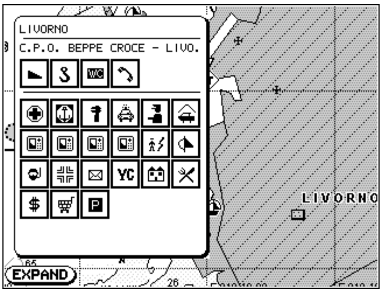


Fig. 3.7a - Automatic Port Info

To expand all available information and get the details on each service of the Port Marina for that cartographic point press [EXPAND].

NOTE *Port Info icon is visible only if the Ports + Services option is On (see Par. 4.1).*

Getting Tide Info

Placing the cursor over the Tide Station icon (see Fig. 3.7b), the chart plotter pops-up the relative automatic info window (see Fig. 3.7c) and allows displaying a graphical page with the tides prediction of the selected object.

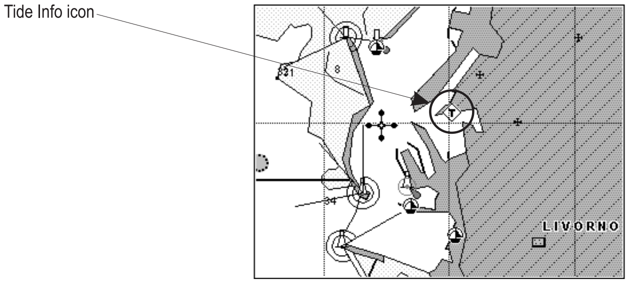


Fig. 3.7b - Tide Info icon

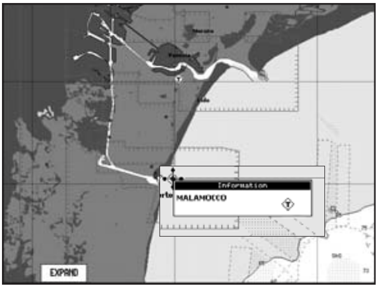


Fig. 3.7c - Tide Info icon

Press [EXPAND], select the Tide height item and press [ENTER] to display the Tide Graph. It shows the Tide height variations during the 24 hours at any given day.

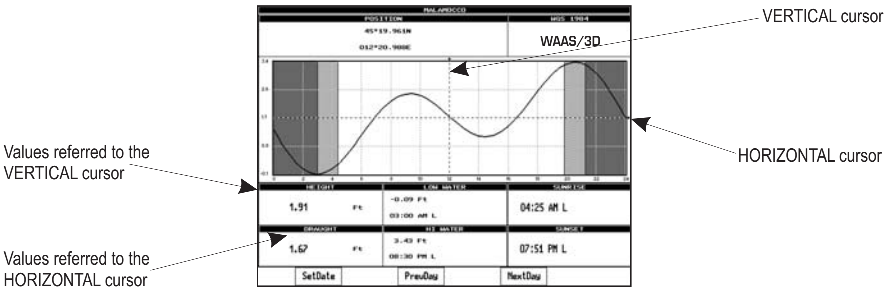


Fig. 3.7d - Tide Graph page

This screen shows that day's Tide Height graph for the area where the Tidal symbol was located. Using [NEXTDAY] and [PREVDAY] it is possible to display future or past tides. If you wish to quickly display the tide for a specific date, press [SETDATE] and enter the required date using the cursor key followed by [ENTER] once the date is set. To simplify reading the graph, the chart plotter displays a moveable Vertical and Horizontal slider which can be moved using the cursor key. Using the up/down cursor key, move the Horizontal slider to correspond with the draft of your boat. Using the Vertical slider you can then read the times at which the graph dips below the horizontal line i.e. the times when you will be in danger of grounding.

NOTE *Tide graph is an approximation of the tide and they should be used in conjunction with traditional tide tables and navigational methods. The Tide height value represents the variation relative to the "Mean Lower Water" value.*

3.8 FIND FUNCTION

The Find function allows searching for the nearest Port Services, Ports by Name and by Distance, Tide Stations, Wrecks, Obstructions, Point of Interest (POI), Lakes Info and Lakes by Name loaded on the C-CARD or it centres the screen over a selected User Point or at desired Coordinates. When the Find function is executed a list of available objects to search is shown.

NOTE *Activating the Find function a Warning message is shown if there is no C-CARD inserted.*

Finding Port Service

To show the nearest port services of a particular type (i.e. the nearest Hospital, sailmaker, bank, etc.).

➤ **[MENU] + "FIND" + [ENTER] + "PORT SERVICES" + [ENTER]**

The icons list of the available services is shown. Use the cursor key to select any facility and press [ENTER]. By selecting one of the facilities the list of the nearest ports (up to 10) in which this port facility is present, will be shown.

Finding Port By Name

To select the Port By Name function following the procedure:

➤ **[MENU] + "FIND" + [ENTER] + "PORT BY NAME" + [ENTER]**

Shows the list of all ports stored on the C-CARD in alphabetical order and allows to search ports by name to locate the ports on the map.

Finding Port By Distance

To select the Port By Distance function following the procedure:

➤ **[MENU] + "FIND" + [ENTER] + "PORT BY DISTANCE" + [ENTER]**

Shows the list of all ports stored on the C-CARD in closest distance order and allows to locate the ports on the map.

Finding Lakes Information

Searches for Nearest Lakes Info:

➤ **[MENU] + "FIND" + [ENTER] + "LAKES INFO" + [ENTER]**

It founds the Outdoor Recreational Area objects. See the following picture:

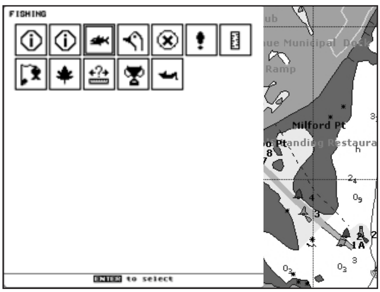


Fig. 3.8 - Outdoor Recreational Area objects

Use the cursor key to select any objects and press [ENTER]. The list of the nearest lakes containing the facility will be shown on the screen.

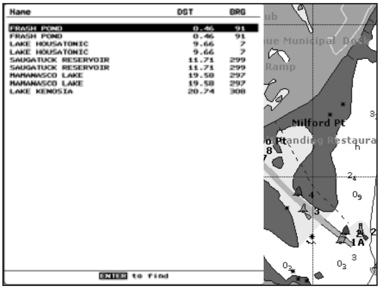


Fig. 3.8a - Nearest Lakes list

Then choose the lake you want and press [ENTER]: the Full Info page is shown.

Finding Lakes by Name

To select the Lakes By Name function following the procedure:

➤ **[MENU] + "FIND" + [ENTER] + "LAKES BY NAME" + [ENTER]**

Shows the list of all lakes stored on the C-CARD in alphabetic order. Pressing **[MENU]** to insert the Lake name.

Finding Points Of Interest

Searches for nearest Points Of Interest (POI):

➤ **[MENU] + "FIND" + [ENTER] + "POINTS OF INTEREST" + [ENTER]**

A sub-menu is opened to find different categories of POIs.

Finding Tide Stations

To show the nearest Tide Stations to the boat position (or to the cursor position if the position fix is not received).

➤ **[MENU] + "FIND" + [ENTER] + "TIDE STATIONS" + [ENTER]**

After a few seconds a window appears. Choose the Tide Station you want and press [ENTER] to display the Tide Graph page. Press [CLEAR] to display the Tide Station chosen.

Finding Wrecks

To show the nearest Wrecks loaded in the C-CARD:

➤ **[MENU] + "FIND" + [ENTER] + "WRECKS" + [ENTER]**

Press [ENTER] or [FIND] to locate the selected Wreck on the map.

Finding Obstructions

To show the nearest Obstructions loaded in the C-CARD:

➤ **[MENU] + "FIND" + [ENTER] + "OBSTRUCTIONS" + [ENTER]**

Press [ENTER] or [FIND] to locate the selected Obstruction on the map.

Finding User Points

To search the User Point by name:

➤ **[MENU] + "FIND" + [ENTER] + "USER POINTS" + [ENTER] + use the cursor to insert name of the Waypoint to show on map + [ENTER]**

Finding Coordinates

To center the map at given coordinates:

➤ **[MENU] + "FIND" + [ENTER] +"COORDINATES" + [ENTER] + use the cursor to insert coordinates + [CLEAR]**

3.9 ALARMS

The chart plotter provides alarms for various functions. You can enter the desired alarm range for each function.

Arrival Alarm

To set an acoustic alarm to sound when the vessel is approaching the destination.

- **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "ARRIVAL ALARM" + [ENTER]**

XTE Alarm

To set an acoustic alarm to sound when the vessel is deviating from a defined course.

- **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "XTE ALARM" + [ENTER]**

Depth Alarm

To set an acoustic alarm to sound when the received depth value (from the depth transducer) is too shallow.

- **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "DEPTH ALARM" + [ENTER]**

Anchor Alarm

To set an alarm to sound when the ship moves off the current ship's position location.

- **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "ANCHOR ALARM" + [ENTER]**

NOTE *By the time the Anchor Alarm is set the current ship's position is saved as origin position. The alarm goes off when the ship moves away from the origin position more than the entered alarm range.*

Audible Alarm

To enable or disable the alarm beeps sound. The visual alarm window will be displayed anyway.

- **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "AUDIBLE ALARM" + [ENTER]**

Grounding Alarm

To verify potential danger to navigation such shallow water (depth areas), inter-tidal areas, land, rocks, obstructions and shoreline constructions. The maps are scanned every 10 seconds. If any of the above objects are found, the chart plotter notifies the danger on a dedicated warning message box. The active "Grounding Alarms" are shown in the Grounding Alarm Report page.
To activate the Grounding Alarm:

- **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "GROUNDING ALARM" + [ENTER]**

The chart plotter scans a sector in front of the boat. The direction is determined by the current boat heading. You can select the length and its angle is 30 degrees. The Grounding Alarm is switched Off by default after a Master Reset.

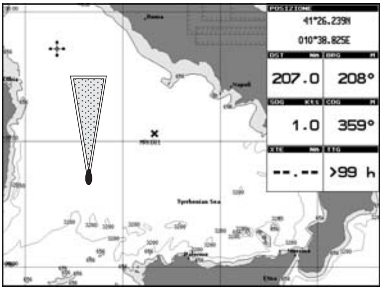


Fig. 3.9 - Grounding Alarm sector

Grounding Alarm Range

To set the length of the sector to be detected among 0.25, 0.5, 1.0 Nm.

➤ **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "GROUNDING ALARM RANGE" + [ENTER]**

Grounding Alarm Report

To display the report of the dangerous objects currently detected.

➤ **[MENU] + "MENU" + [ENTER] + "ALARMS" + [ENTER] + "GROUNDING ALARM REPORT" + [ENTER]**

When any of the searched objects is found in the scanned area, a tick marker is printed on the relative box to identify which dangerous objects have been currently detected. Once the alarm condition is no longer present, the relative tick marker is removed.

NOTE *The alarm "No data available" is shown when no specific cartographic data are found on the C-CARD or when no C-CARD is inserted.*

3.10 USER C-CARD

The chart plotter allows to back up Marks, Routes and Tracks to a User C-CARD. You can also restore the data to internal memory at a later time. This allows virtually unlimited storage. The User C-CARD data storage is organized as a file system.

User C-CARD page

To display the content of a User C-CARD inserted into the C-CARD slot of your chart plotter:

➤ **[MENU] + "MENU" + [ENTER] + "USER C-CARD" + [ENTER]**

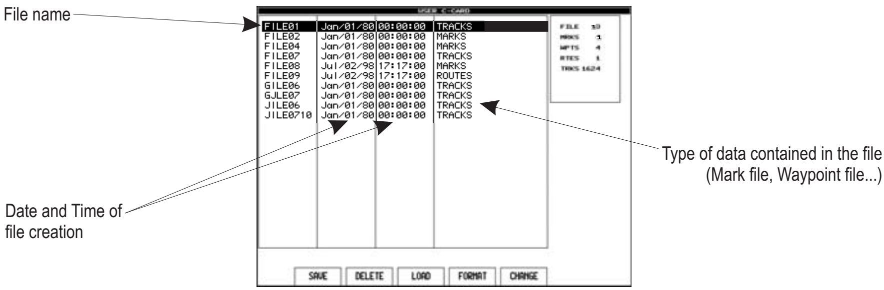


Fig. 3.10 - User C-CARD Menu

Formatting User C-CARD

In order to be able to use a new User C-CARD you must format it first. This operation prepares the User C-CARD to receive and store information:

➤ **[MENU] + "MENU" + [ENTER] + "USER C-CARD" + [ENTER] + [FORMAT]**

NOTE *When a User C-CARD is formatted, all data saved on it will be deleted.*

Saving File on User C-CARD

➤ **[MENU] + "MENU" + [ENTER] + "USER C-CARD" + [ENTER] + [SAVE] + insert the file name and type + [ENTER]**

When a certain type of data (Mark, Route, Track) is saved, a new file is created on a User C-CARD. The file contains all points of the selected type currently stored in the internal memory.

- Save Marks : creates a new file containing all Marks stored in the chart plotter
- Save Route : creates a new file containing all Waypoints belonging to the selected Route (Route number is required)
- Save Track : creates a new file containing all Track points belonging to the selected Track (Track number is required)

NOTE *When naming a file, you may have trouble finding a name that uniquely identifies the file's contents. Dates, for example, are often used in filenames; however, they take up several characters, leaving you with little flexibility. The secret is to find a compromise, a point where you can combine a date with a word, creating a unique filename. The maximum length of the filename is 8 characters. The characters may be numbers (0, ..., 9), letters (A, ..., Z) and spaces (for example legal identifiers are "ABC", "AA", "12121212", "A B C", "1 A 1", and so on.*

Loading File from User C-CARD

➤ **Select the file name in the list + [MENU] + "MENU" + [ENTER] + "USER C-CARD" + [ENTER] + [LOAD]**

The Load function copies the content of the selected file from User C-CARD to the internal memory of the chart plotter. If the selected file contains Marks already present in the chart plotter memory, they are non duplicated. It is required to insert the number of the Route/Track on which loading data: if the Route/Track is not empty, it is overwritten.

Deleting File from User C-CARD

To remove files.

➤ **[MENU] + "MENU" + [ENTER] + "USER C-CARD" + [ENTER] + [DELETE] + [CONFIRM]**

NOTE *Remember that this option permanently erases the file.*

Changing User C-CARD

Allows to change the User C-CARD inserted into the slot:

➤ **[MENU] + "MENU" + [ENTER] + "USER C-CARD" + [ENTER] + [REFRESH]**

4. User Setting Up

4.1 MENU

To set up the map layout:

➤ **[MENU] + "MENU" + [ENTER]**

Map Orientation

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "MAP ORIENTATION" + [ENTER]**

The possible choices are listed in the table below:

North Up	: The map is shown with North upwards
Track Up	: The map is shown with the ship's current heading upwards

Satellite Imagery

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "SATELLITE IMAGERY" + [ENTER]**

TIt is possible to overlay the Satellite image for background map. When it is set On, the Palette is set to Normal to display the proper colors.

Palette

➤ **[MENU] + "MENU" + [ENTER] + "PALETTE" + [ENTER]**

It is possible to set the palette used to enhance the visibility of the screen depending on the surrounding light condition. The possible choices are listed in the table below:

Normal	: It is recommended when the chart plotter is not exposed to the direct sunlight. When this mode is set the maps are displayed in order to use colors as similar as possible to the ones used in the original paper charts.
Night	: It is recommended when the environment is dark in order to reduce the glare of the display. The chart plotter displays maps and screen in darker colors.
Sunlight	: It is designed to enhance the visibility of the screen when the chart plotter is exposed to the sunlight. The maps are much brighter than in the other modes and the depth areas are filled with white color so different depth areas are not easily distinguishable.
NOAA	: Allows setting NOAA paper chart colors presentation.

Zoom Type

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "ZOOM TYPE" + [ENTER]**

Allows more expansions or compression of the chart scale while zooming in or out. Zoom Mode has two options; Standard (default) or Flexi-Zoom. When in Flexi-Zoom mode, a short **[ZOOM...]** push causes a change of chart, whilst a long **[ZOOM...]** push (press and hold) causes a pop-up window to be displayed on a corner of the screen. The window shows the current Zoom Factor. By pressing **[ZOOM IN]**/**[ZOOM OUT]** the map is expanded or compressed according to the zoom factor selected. The Window is automatically closed if **[ZOOM...]** is not pressed for 2 seconds and the selected zoom factor will be used at the next zoom in/out.

Font & Symbols

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "FONT & SYMBOLS" + [ENTER]**

On MAX charts it is possible to set the size of all names and symbols drawn on the charts, selecting between Normal size (the regular characters size) and Large size.

NORMAL size **LARGE size**

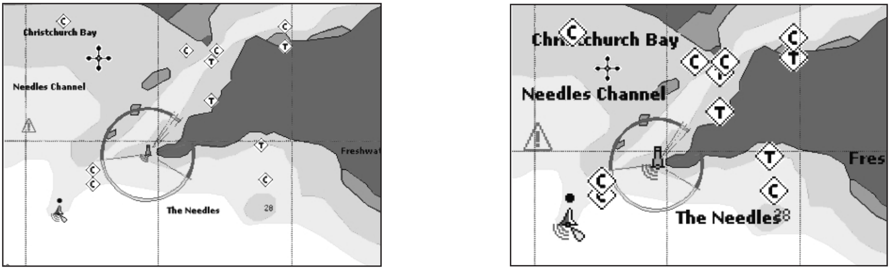


Fig. 4.1 - Example of Normal size (on the left side) and Large side (on the right side) settings

Perspective View

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "PERSPECTIVE VIEW" + [ENTER]**

Chart data may be projected in perspective mode during navigation. This function allows setting the panoramic View of the chart. As the upper side of the map is more compressed than the lower side, a wider map area is visible. The perspective view allows showing more chart information immediately ahead and around the cursor.

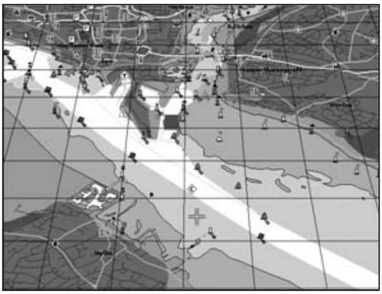


Fig. 4.1a - Perspective View

Dynamic Nav-Aids

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "DYNAMIC NAV-AIDS" + [ENTER]**

This function allows settings blinking lights on Nav-Aids. The blink period and color of each Nav-aid is read from the Nav-Aid attributes available on the data cartridge. When the ship is inside the Nav-Aid nominal range, the light of the Nav-Aid will start blinking.

NOTE *When Live Nav-Aids option is set to On, when the flashing light is Off, or when fix position is out of the sector, the light color is displayed by using a faint light color.*

Mixing Levels

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "MIXING LEVELS" + [ENTER]**

When the map coverage at the current zoom level does not fill the entire screen, the chart plotter draws the rest of the map expanding the cartographic informa-

tion read from, at most, two zoom levels above the current zoom level. For this reason the map is drawn three times: firstly it draws the two levels before the current level and then the current level. The area covered by the cartographic data read from the previous levels is identified by a dotted pattern. When the cursor is moved on an area not covered by data of the current level the chart plotter zooms out to the first level covered by cartographic data.

NOTE *The Mixing Levels function works only with the new C-CARDs. It also affects the speed of the redraw of the screen. If this function is not used it may be disabled.*

Safety Status Bar (DSI = DATA SAFETY INDICATOR)

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "SAFETY STATUS BAR" + [ENTER]**

The possible choices are listed in the table below:

On	: The Safety Status Bar is shown.
Off	: The Safety Status Bar is not shown.
Icon	: The Safety Status Bar is not shown, but a Warning alarm Icon is shown on the corner of the map screen as soon as any item controlled by the DSI (**D**ata **S**afety **I**ndicator) function returns an alarm condition. The Warning Icon remains displayed until the alarm condition persists. Placing the cursor over this Icon, a quick help message is shown next to the Icon, allowing to show the Safety Status Bar. In this case - when the Safety Status Bar is opened via Warning alarm Icon - it is allowed to obtain information about each "active" Safety Status box (the red ones): it is possible to select them by cursor movement left/right, and a list of active alarms is shown underneath the selected box. By pressing [CLEAR], the Safety Status Bar is removed from the screen.

When Safety Status Bar is On, a status bar with six boxes showing the status of certain functions is displayed. Any warning or alarm condition is identified by the red color to indicate possible risk.



Fig. 4.1b - Safety Status Bar

Boxes definition is as follows:

(1) Zoom

- Normal: when the chart is displayed at normal scale.
- U. Zoom: red when the chart is under-zoomed out more than twice normal scale, gray otherwise.
- O. Zoom: red when the chart is over-zoomed in more than twice normal scale, gray otherwise.
- Chart Lock: red when the chart is zoomed in more than twice normal scale, gray otherwise.

(2) Best Map

Red when a more detailed chart is available under the cursor position.

(3) Data Off

Red when at least one of the following objects or layers is turned off (by the user): Depths/soundings; Wrecks/obstructions; Tracks/routes; Attention areas; Nav-Aids.

(4) Declutter

Displays red when clearing overlapping objects.

⑤ **Dangers**
Red when "Guardian Technology" detects one of the following objects: Land, Intertidal, Depth Area, Rocks, Obstructions, Shoreline Constructions, Fishing Facility, Wrecks, Dragged area, Diffusion area, Mooring facilities, Pingos and Production installations.

⑥ **Caution**
Red when "Guardian Technology" detects cautionary or restricted area.

Chart Language

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "CHART LANGUAGE" + [ENTER]**

The possible choices are listed in the table below:

Language	: Allows setting the language to display chart information. The language is chosen among the list of languages available on the cartographic data (C-CARD or embedded charts).
Mode	: Defines how objects are translated. It is possible to choose between the three following options: Off — Uses the same Language used for LANGUAGE. If the selected language is not present on the objects information, English is used instead; English — Always uses English; Local — Uses the first Local language present on data. If no Local language is available, English is used instead.

NOTE *a. When User Interface Language is changed, Chart Language settings are set as follows: MODE is set to Off and Chart Language is set as the User Interface Language selection if available on the chart data, otherwise is set to English.*
b. If the cartographic data is changed (for example the C-CARD is removed or replaced), Chart Language settings should be verified and if necessary changed.

Currents Prediction

➤ **From the Chart page, [MENU] + "MENU" + [ENTER] + "CURRENTS PREDICTION" + [ENTER]**

A window is shown on the low-left side of the chart. It is possible to see the variation of the Tidal arrows on the selected area at any given time. Press [SET TIME] to set the date and time manually, press [INCR]/[DECR] to increase/decrease time and [EXIT] to exit.

4.2 MAP

To set up the map layout:

➤ **[MENU] + "SETUP" + [ENTER] + "MAP" + [ENTER]**

Allows the user to customize the following selections and is divided into: Marine Settings, Depth Settings, Land Settings, Chart Settings and Underwater Objects Settings.

Display Mode

➤ **[MENU] + "SETUP" + [ENTER] + "MAP" + [ENTER] + "DISPLAY MODE" + [ENTER]**

Selects from a predefined table what cartographic objects are displayed and which display options are set. Preprogrammed settings are user selectable from Full, Medium, Low, Radar, Tides, Custom. The table below shows the selections for each mode:

Setting	Full	Medium	Low	Radar	Tides	Custom (Default values)
Place Names	On	On	On	On	On	On
Name Tags	On	Off	Off	Off	Off	Off
Nav Aids & Light Sectors	On	No Sector	No Sector	No Sector	Off	On
Attention Areas	On	On	Off	Off	Off	On
Tides & Currents	On	Off	Off	Off	On	On
Seabed Type	On	Off	Off	Off	Off	On
Ports & Services	On	On	Off	On	Off	On
Tracks & Routes	On	Off	Off	Off	Off	On
Depth Range Min	0 Mt	0 Mt	0 Mt	0 Mt	0 Mt	0 Mt
Depth Range Max	9999 Mt	9999 Mt	9999 Mt	9999 Mt	9999 Mt	9999 Mt
Land Elevations	On	On	Off	Off	Off	On
Land Elevation Values	On	Off	Off	Off	Off	On
Roads	On	Off	Off	Off	Off	On
POI	On	Off	Off	Off	Off	On
Lat/Lon Grid	On	Off	Off	Off	Off	On
Chart Boundaries	On	Auto	Off	Off	Off	Auto
Value-Added Data	On	Off	Off	Off	Off	On
Chart Lock	On	On	On	On	On	On
Underwater Objects Limit	9999 Mt	10 Mt	10 Mt	10 Mt	10 Mt	10 Mt
Rocks	Icon+Depth	Icon	Icon	Icon	Icon	Icon
Obstructions	Icon+Depth	Icon	Icon	Icon	Icon	Icon
Diffusers	Icon+Depth	Icon	Icon	Icon	Icon	Icon
Wrecks	Icon+Depth	Icon	Icon	Icon	Icon	Icon

Marine Settings

To control the display on the map of the marine features.

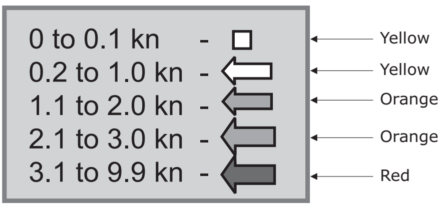
Place Names : Sets On/Off the displaying of the Names (local area names).

Name Tags : Sets On/Off the displaying of a tag for particular chart objects that either includes the Name of the chart object or the Depth of an Underwater chart object. Available for Buoys, Towers, Beacons and Port Marinas.

Nav Aids & Light Sectors : Sets On/Off/No Sector the graphical presentation of Lights, Signals, Buoys and Beacons. If No Sector is selected Nav-Aids are shown, Light Sectors are hidden

Attention Areas : Sets On/Off the displaying of Attention Areas (areas in which special attention by the mariner is required, because of natural or man-made hazards, or sailing regulations and restrictions. Moreover a special symbol (!) is placed inside the area selecting On option. This is valid also for the categories: FISHING FACILITY, MARINE FARM/CULTURE, MILITARY PRACTICE AREA, RESTRICTED AREA, SEAPLANE LANDING AREA. When the area is small, it is identified only by the boundary).

Tides & Currents : Sets On/Off the displaying of the Tides and Currents. The worldwide database with tidal stream information is available with MAX C-CARDs. When data/time is available, Tidal stream arrows are shown on the charts, indicating the direction and strength of the Tide. If no data/time is available from the GPS or the chart plotter is not in Simulation mode, the icon on the map is generic one. The color of the arrow denotes the strength of the current as follows:



When the chart plotter receives a valid position fix, the Tide icons are shown on the charts on the basis of the current date and time: the screen displays and changes arrows as date/time changes.

Seabed Type : Sets On/Off the displaying of the Seabed Type.

Ports & Services : Sets On/Off the displaying of the Ports and Services (areas along shore with facilities for mooring, downloading and uploading of ships, generally sheltered from waves and winds. Port installations are piers, wharves, pontoons, dry

	docks, cranes...).
Tracks & Routes	: Sets On/Off the displaying of the Tracks and Routes (recommended and established routes for ships at sea, including traffic separation schemes, deep water routes).

Depth Settings

To control the display on the map of the depth informations.

Depth Range Min	: Sets a minimum reference for the Depth Areas.
Depth Range Max	: Sets a maximum reference for the Depth Areas.

Land Settings

To control the display on the map of the terrestrial features.

Land Elevation	: Sets On/Off the Land Elevation display.
Land Elevation Values	: Sets On/Off the displaying of the Land Elevations Values.
Roads	: Sets On/Off the displaying of the Roads.
POIs	: Sets On/Off the displaying of Points Of Interest.

Chart Settings

To control the display on the map of the chart features.

Lat/Lon Grid	: Sets On/Off the displaying of the grid of parallels (of Latitude) and meridians (of Longitude) drawn on the map.
Chart Boundaries	: Sets On/Off the displaying of the Chart Boundaries, which represents the boundaries of the charts available on the chart plotter. Selecting Auto instead, if we are in background charts only the first chart levels contained in the C-CARD are displayed, if we are in a charts level contained in the C-CARD the next four charts level are displayed.
Value-Added Data	: Sets On/Off the displaying of the Value Added Data. The Value Added Data (VAD) is a collection of additional cartographic objects which are not present on the original paper chart (from which the electronic chart derives). These objects have been obtained from other sources and then merged to the electronic charts in order to provide more information useful for the navigation. VAD object can be any cartographic objects and it can be distinguished from the official-chart-objects from the Quick Info. A dedicated icon is shown on the Quick Info window to indicate that the object queried is a VAD. The same icon is also shown on the Full Info page and in addition the extended text Value Added Data is shown on the details of the VAD object.
Chart Lock (*)	: Sets On/Off the Chart Lock option. When Chart Lock is On, the available zoom scales are only the ones containing cartographic data. Instead when Chart Lock is Off, it is possible to zoom down into zoom scales not covered by cartographic data after the last available zoom scale covered by cartographic data. The DSI window, if present, will show “NO CHART”, when an empty level is entered in the location of map expansion mode.

NOTE* *When an empty level is entered, the message “No cartographic coverage” is shown on a window in a corner of the map display. The warning message is always displayed as long as the current zoom has no data coverage.*

Underwater Objects Settings

To control the display on the Underwater Objects.

Underwater Objects	: Selects the max depth value to display Underwater Objects. If value is set to 0 Mt, the Underwater Objects are not shown on the charts. If value is more than 0 Mt (i.e. 10 Mt), in the Range from 0 Mt to the selected value the Underwater Objects are displayed according to their setting below. The default setting is 10 Mt.
Rocks	: Sets Off/Icon/Icon+Depth* the displaying of the Rocks.
Obstructions	: Sets Off/Icon/Icon+Depth* the displaying of the Obstructions.
Diffusers	: Sets Off/Icon/Icon+Depth* the displaying of Diffusers.
Wrecks	: Sets Off/Icon/Icon+Depth* the displaying of Wrecks.

NOTE* *Choose the options: OFF (the object is not visible independently of the selected "Underwater Object Depth Value"); ICON (the object icon is visible without tags, in the range selected from "Underwater Object Depth Value" option); ICON+DEPTH (the object icon and tag is visible, in the range selected from "Underwater Object Depth Value" option).*

4.3 GENERAL DISPLAY

To set the general settings:

➤ **[MENU] + "SETUP" + [ENTER] + "GENERAL DISPLAY" + [ENTER]**

Look Ahead	: Allows, when it is On and Home mode is set, to place map on the screen related to the fix position and direction, so the map shown is that before the ship.
Orient. Resolution	: Sets the resolution angle for the Map Orientation, in the range [30, 60] degrees.
Time Reference	: Allows switching the Time Reference between UTC or local time, by entering the Local Time offset.
Time Format	: Selects the format for the time between 12 and 24 hours.
Date Format	: Selects the Date Format between MM-DD-YY (month-day-year) and DD-MM-YY (day-month-year).
Time Line	: The Time Line is a graphical indication of the direction in which the Vessel is heading. The Time Line origin is the vessel's position so the time line movement is synchronized with the vessels Icon. Time Line course is given by the value of COG (Course Over Ground) and its length is proportional to the SOG (Speed Over Ground). It is possible to select the desired value among Off/2/10/30 Min/ 1/2 hours/Infinite.
User Points	: Object you place on the chart identified by its coordinates and displayed on the screen with a reference symbol (see Mark, Waypoint). It is possible to select the mode of display the User Point on the screen among Hidden, Icon or Visible.
Auto Info	: Allows displaying information on cartographic object when the cursor is placed on it. The Automatic Info On Points shows information when the cursor is placed on points (as Port Services, Tides, lights, wrecks, rocks, buoys, beacons, obstructions, land markers, etc.). The Automatic Info On All shows information when the cursor is placed on points, on lines (as Depth contours, Traffic Separation, Territorial Sea, Cartographic Lines etc.) on areas (Depth, Built-up, Sea, Attention, Restricted etc.) and on names (on the beginning of the text -hot spot- or on any of the characters of the name -name message box-). The details on Land, Source of Data, Cartographic Area and Spot Soundings are not shown.
Keypad Beep	: Single audio beeps emitted any time the chart plotter keypad is pressed. If the incorrect key is pressed or the function required cannot be executed, the chart plotter emits three beeps. The keypad beep can be enabled or disabled from the menu.
Nav Aids	: Allows to set the Nav Aids presentation as US (Draw Nav-Aids using NOAA symbology) or INTERNATIONAL (Draws Nav-Aids using international symbology). When selected it affects Lights, Signals, Buoys & Beacons display.

4.4 UNITS

To select the desired units of measure:

➤ **[MENU] + "SETUP" + [ENTER] + "UNITS" + [ENTER]**

Distance	: Selects the unit for Distance among Nm, Sm, Km.
Speed	: Selects the unit for Speed among Kts, Mph, Kmh.
Depth	: Selects the unit for Depth among Ft, FM and Mt.
Altitude	: Selects the unit for Altitude of GPS Antenna on the medium sea level. The available choices are Ft, FL and Mt.
Fuel	: Selects the unit for Fuel between Liters or Gallons.
Temperature	: Selects the unit for Temperature between F or C degrees.
Wind Speed Unit	: Selects the unit for Wind Speed among Kts, m/s, Kmh, Bft.

4.5 NAVIGATION

To handle the functions related to navigation:

➤ **[MENU] + "SETUP" + [ENTER] + "NAVIGATION" + [ENTER]**

Coordinate System	: The possible choices are ddd mm ss (degrees, minutes and seconds), ddd mm.mm (degrees, minutes and hundred of minutes), ddd mm.mmm (degrees, minutes and thousands of minutes), TD (TD function allows converting GPS coordinates to Loran-C coordinates and vice versa, see TD).
Fix Datum	: Sets the datum reference used by the GPS receiver connected to (or integrated in) the chart plotter so that the chart plotter converts the position received from the GPS to the Map Datum currently selected in the menu in order to match the position from the GPS with the position on the charts. You must know what datum reference is used by the GPS and set it in the Fix Datum option.
Map Datum	: Allows selecting any Geodetic Datum reference from the over 100 available on the chart plotter. Map Datum selection switches to the selected reference datum applying the datum offsets stored with the charts.
Fix Correction	: Turns On/Off the Correction from the positioning system. If the new Correction is calculated, but the Correction is not enabled, the ship's position is not changed.
Compute Correction	: Corrects fixes from the positioning instrument. By placing the cursor on the ship's real position and selecting this option, the error is calculated and internally memorized for appropriate correction, but not applied.
Correction Offset	: Allows manual correction of fix position. The correction is entered as X, Y offset in minutes and thousand of minutes +/- 9.999.

4.6 COMPASS

To set the reference heading information such as bearing angles (True or Magnetic), the Magnetic Variation source and to enter Compass Calibration values.

➤ **[MENU] + "SETUP" + [ENTER] + "COMPASS" + [ENTER]**

Bearings	: Selects either degrees magnetic or degrees true. If magnetic readings are selected the variation is computed automatically for every zone as soon as the chart is displayed.
Variation	: It is possible to calculate the Magnetic Variation in an Automatic or Manual mode, by inserting the step for calculation of Magnetic Variation.
Calibration	: The variation table is used to match magnetic value readout on the chart plotter comparable with the value given by the compass of the boat. In other words, since the compass of the boat must be compensated (due to the iron masses, ...), we use the same values given by the chart plotter. This means that, for example, if the BRG to the next Waypoint readout in the chart plotter display is "X" Mag degree, if you steer the boat reading "X" Mag degree from the compass, you are driving well toward the next Waypoint.

4.7 INPUT/OUTPUT SETUP

WARNING

After a software upgrade the RAM is cleared and then the chart plotter starts with the default settings. Then you have to go into the Input/Output menu and set again the proper input format.

GPS Connection CM 169CS/CM PRO

Connects the GPS to the GPS Port (serial Port 3). To choose your preferred setting follow the procedure:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Port 3 Input" + [ENTER] + "NMEA-4800-N81-N" + [ENTER]**

GPS Setup Menu

To set your desired configuration for the connected GPS.

Internal GPS	: **CM 169CSi/CM iPRO** Enables or disables the Internal GPS.

Restart GPS	: Restarts all GPS processes. Once executed, the message "Done" is shown.
Diff. Corr. Source	: Sets what kind of Differential Correction will be used by the GPS between WAAS and RTCM (beacon correction).
Navigation Speed	: Sets the Navigation Speed among Low Speed, Medium Speed and High Speed.

CM iPRO:

Fish Finder Transmission

The Fish Finder embedded is connected directly to the Port 2. To switch the internal Fish Finder transmission On/Off follow the procedure:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "FISH FINDER ON/STANDBY" + [ENTER]**

Autopilot Connection

Connect the Autopilot to the serial Port 1, 2 or 3.

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Port 1/2/3 Output" + [ENTER]**

Then choose your preferred setting among the NMEA available settings NMEA 0183 4800-N81-N, NMEA 0180, NMEA 0180/CDX and press [ENTER] to confirm.

External NMEA Connection

Connect the External NMEA to the serial Port 1, 2 or 3.

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Port 1/2/3 Input" + [ENTER]**

Then choose your preferred setting among the NMEA available settings NMEA 1200-N81-N, NMEA 4800-N81-N, NMEA 4800-N82-N, NMEA 9600-O81-N, NMEA 9600-N81-N and press [ENTER] to confirm.

C-COM GSM PLUS Connection

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Port 1 Input" + [ENTER] + "C-COM" + [ENTER]**

The modem C-COM can be connected also to the Port 2, 3, in this case select the format on the used port.

NOTE *The connection is valid for the C-COM IR and C-COM RS232 too.*

Output Sentences

The chart plotter allows customizing the NMEA-0183 sentence transmitted on each port. Each port can transmit a different set of sentences among: GLL, VTG, BOD, XTE, BWC, RMA, RMB, RMC, APB, WCV, GGA, HSC, HDG:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Port 1/2/3 Output Sentences" + [ENTER]**

NMEA Data Input

Allows the chart plotter to act as a computer terminal and display the incoming data exactly as it is received:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "NMEA Data Input" + [ENTER]**

Cable Wiring page

Shows a window containing the cable wiring related to the quick disconnect bracket:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Cable Wiring" + [ENTER]**

Send/Receive Routes & Marks

Sets the desired port used for transferring User Points and Routes functions:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Send/Rec Routes & Marks" + [ENTER] + "Port 1/2/3" + [ENTER]**

C-Link menu

Select the Primary or Secondary Station (see the dedicated Chapter):

- ➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "C-LINK" + [ENTER] + "Secondary Station/Primary Station" + [ENTER]**

4.8 AIS

AIS is an Automatic Identification System. It has been introduced to improve the safety of navigation by assisting in the efficient operation of ship-to ship, ship reporting and VTS applications. The system should enable operators to obtain information from the ship automatically, requiring a minimum of involvement of ship's personnel, and should have a high level of availability. AIS transponders installed on IMO vessels use VHF frequencies to:

- Transmit details of their own vessel
- Receive details from other vessels or navigation aids within VHF range.

Information being transmitted from vessels over 300 tons that, due to recent worldwide legislation, are required to fit Class "A" AIS transponders.
Connecting to the chart plotter an AIS receiver (please contact your local dealer), vessels with AIS transponder within VHF range are displayed on screen giving the skipper or navigator a visual interpretation of the data of nearby vessels. This improves safety, and specifically for collision avoidance reasons.

4.8.1 AIS System Definitions

- **Target**
  It is a vessel equipped with AIS. Information about the Targets is being received by AIS Receiver and displayed on the screen.
- **CPA**
  Closest Point of Approach is the closest distance that will be achieved between your vessel and the tracked Target, based on your vessel's speed and direction and the Target's speed and direction.
- **CPA Limit**
  This is the distance from your vessel that a Target may reach before a Target is deemed a threat.
- **CPA Alarm**
  Occurs if CPA is less or equal to CPA Limit. This test is done for active Targets only.
- **TCPA**
  Time to closest Point of Approach is the time remaining until the CPA will occur.
- **TCPA Limit**
  This is the time remaining before the CPA is reached.
- **TCPA Alarm**
  Occurs if TCPA is less or equal to TCPA Limit. This test is done for active Targets only and if CPA value is less or equal to CPA Limit.
- **Radio Call Sign**
  International call sign assigned to vessel, often used on voice radio.
- **Name**
  Name of ship, 20 characters.
- **MMSI**
  Maritime Mobile Service Identity.
- **MMSI number**
  A unique 9 digit number that is assigned to a DSC radio station. It primarily registers the boat information in the U.S. Coast Guard's national distress database for use in emergency situations.
- **Active Target**
  Target located within the Activation Range. Active Target is represented by

oriented triangle with COG and Heading vectors. Rate of turn may also be displayed.

- **Dangerous Target**
  Target detected by CPA or TCPA Alarm. Dangerous Target is Active Target by definition. For better visibility Dangerous Target symbol is flashing.
- **Sleeping Target**
  Target located outside the Activation Range. Sleeping Target is represented by a small oriented triangle.
- **Lost Target**
  When the AIS info is not received from that vessel for 3.5 minutes. The presentation will be a flashing black triangle with a cross through.
- **Activation Range**
  Range around your boat where Targets become active. AIS Target become active within this range. Activation Range should be greater than CPA Limit by definition.

NOTE *A Target is removed from the screen if data is not received for 10 minutes.*
The maximum number of tracked Targets is 100.
Depending on the scale the presentation of the Targets change to remove clutter on the screen.
This information is updated every 3 seconds to 6 minutes depending on speed and rate of turn, enabling the track of the vessels in range to be plotted.

TARGET STATUS	DESCRIPTION	SYMBOL
ACTIVE TARGET	Target located within the Activation Range.	
DANGEROUS TARGET	Target detected by CPA or TCPA Alarm. Dangerous Target is Active Target by definition.	 Flashing
SLEEPING TARGET	Target located outside the Activation Range.	
LOST TARGET	Ais info is not received from that vessel for 3.5 minutes.	

Fig. 4.8.1 - AIS Symbols

4.8.2 AIS Menu

To configure the chart plotter to receive AIS data, follow the procedure:

➤ **[MENU] + "SETUP" + [ENTER] + "AIS" + [ENTER]**

Display	: Turns ON or OFF the display of AIS targets overlay on the cartography.
Activation Range	: Defines the range from the fix within which the AIS Target becomes active. The values allowed are from 0.1 to 20 Nm.
CPA Alarm	: Turns ON or OFF the alarm.
CPA Limit	: The values allowed are from 0.1 to 10 Nm.
TCPA Alarm	: Turns ON or OFF the alarm.
TCPA Limit	: The values allowed are from 1 to 30 min.

4.8.3 To set the chart plotter for receiving AIS

Make sure that the AIS receiver is properly connected to the chart plotter.
The chart plotter reads the AIS NMEA message VMD, type 1, 2, 3 and 5.
Select the used serial port and transmission speed by following the procedure:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "Port n Input" + [ENTER] + "m" + [ENTER]**

Where: n = Port 1/Port 2/Port 3
m = NMEA-0183 4800-N81-N
AIS 38400
according to the transmission speed of your AIS receiver.

4.8.4 Quick Info on AIS Target

By placing the cursor over a AIS Target icon, the following information is displayed:

- **Vessel Name**
- **MMSI number**
- **Radio Call Sign**
- **SOG**
- **COG**
- **CPA and TCPA values**

NOTE *The selected AIS Target icon is surrounded by a square frame when user places the cursor over the icon.*

4.9 C-WEATHER SERVICE

C-Weather Service[E] is an innovative meteorological forecasting system with the ability to visualize the weather forecast, overlaying it on cartography. The weather data is held on Jeppesen Marine's weather server, which can be accessed via a C-COM modem connected to the chart plotter or by using the PC Planner (or the DPS - Dealer Programming System) saving the weather data on a User C-CARD. The weather format data available are:

Data Type	Display
WIND (Speed & Dir)	- 0 →
WAVE Height & Dir	- 1 →
TEMPERATURE	18°
HUMIDITY (%)	30
VISIBILITY	20
WEATHER TYPE: Sun	
WEATHER TYPE: Rain	
WEATHER TYPE: Fog	
WEATHER TYPE: Snow	
WEATHER TYPE: Clouds	
WEATHER TYPE: Partly Cloudy	
WEATHER TYPE: Thunderstorm	

Fig. 4.9 - Weather data package

4.9.1 C-WEATHER SERVICE Menu

To select the menu:

➤ **[MENU] + "SETUP" + [ENTER] + "C-WEATHER SERVICE" + [ENTER]**

It opens a sub-menu with the following options.

- **Download**
- **Copy From C-CARD**
- **Prediction**
- **Real Time View**
- **Type of Data**

Download

➤ **[MENU] + "SETUP" + [ENTER] + "C-WEATHER SERVICE" + [ENTER] + "DOWNLOAD" + [ENTER]**

Allows to connect the software to the Jeppesen Marine weather server and to download Jeppesen Marine weather data directly via C-COM. It activates the following sub-menu:

Select Country to Call	: Allows the selection of the country to call. The whole telephone number set is automatically updated after every download.
SIM Pin	: Allows inserting of the PIN of the SIM.
Download Area	: Allows the weather download: a squared grey area, where the weather data will be downloaded, is centered on cursor position. See the following picture.

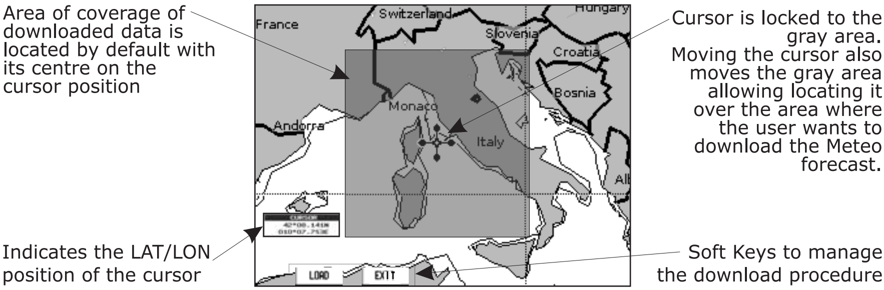


Fig. 4.9.1 - Download Area

Press [LOAD] to activate the C-Weather Download: the whole data package (see the previous "Weather data package" table) are downloaded. [STOP] allows to interrupt the data download.
At the end of the operation press [EXIT] to close the window.

Copy from C-CARD

➤ **[MENU] + "SETUP" + [ENTER] + "C-WEATHER SERVICE" + [ENTER] + "COPY FROM C-CARD" + [ENTER]**

Allows the whole data package C-Weather loading from the C-CARD.

Prediction

➤ **[MENU] + "SETUP" + [ENTER] + "C-WEATHER SERVICE" + [ENTER] + "PREDICTION" + [ENTER]**

Allows selecting the Layer of specific weather data to be displayed on the screen and to change date and time of the forecast preview.
The following functions are available:

Panning	: default usage of the cursor key is the normal panning function.
Zoom In/Out	: zoom in/out functions are allowed as usual by using [ZOOM IN]/[ZOOM OUT].
Set of Date and Time	: [DATE] to modify date and time values.
Layer selection	: [LAYER] to cycle of the weather layers.
Exit	: [EXIT] or [CLEAR] to close the weather prediction page.

Real Time View

➤ **[MENU] + "SETUP" + [ENTER] + "C-WEATHER SERVICE" + [ENTER] + "REAL TIME VIEW" + [ENTER]**

The following selections are available:

Real Time View On	: the data is shown (the area of the download) at the current date and time (received from the GPS).
Real Time View Off	: the Weather data is not displayed.

The layer displayed is the one selected into the previous menu item.

Type of Data

➤ **[MENU] + "SETUP" + [ENTER] + "C-WEATHER SERVICE" + [ENTER] + "TYPE OF DATA" + [ENTER]**

Allows selecting the type of data, see the previous Fig. 4.9.

4.10 FISH FINDER

The chart plotter combined with the sonar performance of the Fish Finder is one of the most advanced marine navigation system available.
To select the Fish Finder menu, first select one of the pages related to the Fish Finder:

➤ **[PAGE] + move the cursor up/down + [ENTER]**

Once the Fish Finder page is selected, access the Fish Finder menu by pressing:

➤ **[MENU]**

NOTE *The Fish Finder display page is available only if the Fish Finder is powered On.*

4.11 RADAR

The Radar consists of a scanner unit which illuminates targets with microwave energy and then collects the echoes from those targets. The scanner unit includes the Radar antenna, transmitter, receiver and necessary electronics. The scanner unit is connected to a chart plotter equipped with software capable of displaying the Radar functions. To select the Radar menu, first select one of the pages related to the Radar:

➤ **[PAGE] + move the cursor up/down + [ENTER]**

Once the Radar page is selected, access the Radar menu by pressing:

➤ **[MENU]**

For more information see the specific User Manual.

NOTE *The Radar display page is available only if the Radar is connected and powered On.*

4.12 SYSTEM INFORMATION

To see details about the software and cartography data installed.

➤ **[MENU] + "SETUP" + [ENTER] + "SYSTEM INFORMATION" + [ENTER]**

Opens the System Information page.

WORLD BACKGROUND CHARTS

The internal background charts can be updated to include the MAX A and B level charts which provide improved marine data, rivers, lakes, terrestrial data (major streets , highways , railways, etc...), Nav-Aids, depth areas, territorial water areas, etc... by reading them from a special data C-CARDs (contact your local dealer). All units must have the WorldWide Background upload function that is activated from the system.

Worldwide Background Update

The System Update menu is entered from the About page. To select this menu:

➤ **Plug the special data C-CARD + [MENU] + "SETUP" + [ENTER] + "SYSTEM INFORMATION" + [ENTER] + [MENU] + "Update Worldwide Charts" + [ENTER]**

5. C-LINK

5.1 C-LINK

C-Link system is a feature which allows to sharing the same cartographic data between two chart plotter units (CP) linked via serial I/O port.
In order to activate C-Link function, a “MAX data C-CARD” (called REGULAR C-CARD) must be inserted into one of the two chart plotters and a special MAX data C-CARD (called MIRROR C-CARD) must be inserted on the other chart plotter.
The two MAX data C-CARDs must have the same code and revision. So, the MIRROR C-CARD can be utilized only on a chart plotter linked to another chart plotter provided with the equivalent REGULAR C-CARD.
It is important to point out that the two chart plotters must have the update s/w versions that allow C-Link function.

How C-Link system works

When the CP is powered up, it switches into the “Stand-Alone Mode”. In this work mode, the CP unit periodically scans all the available C-CARD slots searching for MIRROR C-CARDs.
When one or more MIRROR C-CARD is found (in one or both CPs) a special connection is established between the CPs to habilitate the MIRROR C-CARDs.
If a regular C-CARD which has previously activated a MIRROR C-CARD is removed, even the MIRROR card will be not read anymore on the other unit.

C-Link serial connection

The two chart plotters should be connected via serial ports. Any of the available ports can be used, the software will recognize automatically the serial ports used.
A typical connection is as follows:

CP1		**CP2**
TX	————————>	RX
RX	<————————	TX
GND	<———————>	GND

5.2 C-LINK NAVIGATION DATA TRANSFER

This function allows transferring C-Link navigation data (Route Name, Destination ID & Position, Next Waypoint ID & Position, Total Route length, Fuel Consumption Rate, ETA, TTG etc.) (Hereinafter “C-Link navigation data”) between two chart plotters linked through the C-Link system.
The chart plotters can be set to operate in two modes:

- MASTER mode (Primary Chart Plotter)
- SLAVE mode (Secondary Chart Plotter)

When the navigation is activated on the Master chart plotter, the C-Link navigation data will be continuously sent to the Slave until the navigation is active.
If the Master is navigating to a Single Destination, the Slave will show the Destination position and activate the navigation to it.
If the Master is navigating to a Route, the Slave will show the Route Leg composed by the Destination and the Waypoint after the Destination (Next Waypoint) and activate the navigation to it.

Any variation to the current C-Link navigation data will be transferred from the Master to the Slave.
The Slave will be provided with a few dedicated pages to show the C-Link navigation data received from the Master.

Operations

Introductive elements

It is important remark, once more, that this function does not transfer the whole route but just the information relative to the navigation. Such information will be removed from the Slave Chart Plotter as soon as the navigation is terminated.
C-Link navigation data is exchanged by using two NMEA-0183 C-MAP proprietary sentences: $PCMPN,1 and $PCMPN,2.
When the navigation is activated on the Master, it starts outputting the C-Link navigation data. If the Slave is connected, all C-Link navigation data received are stored in its memory and the navigation is started.

The information sent by the Master consists of the following values:
- Navigation mode (To Single Destination / to a Route)
- Route Name (*)
- Destination ID
- Destination Position
- Next Waypoint ID (*)
- Range from Destination to next Waypoint (*)
- Bearing from Destination to next Waypoint (*)
- Route Length (*)
- Distance from Destination to Last Route Waypoint (*)
- Remaining Route Legs (*)
- Planned Cruising Speed
- Average Fuel Consumption
- Initial Fuel Load

C-Link navigation data can refer to:
- Single Destination navigation
- Route Following navigation.

Values identified by (*) are sent only for Route Following navigation.
The Destination Icon, Navigation leg (Fix Position to Destination), the Next Waypoint Icon and all other relevant C-Link navigation data will be shown on the Slave chart plotter. Any variation of the C-Link navigation data on the Master will be communicated to the Slave so to keep data aligned on both devices.

Master Chart Plotter

Operating mode

To select the Master mode follow the procedure:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "C-LINK" + [ENTER] + "Primary Station" + [ENTER]**

Master mode is the default factory setting. All regular chart plotters' functions are allowed. As soon as the Destination is placed, the master chart plotter will start transmitting all C-Link navigation data,
In Master mode the C-Link navigation data received from the NMEA port is ignored. So, if the two chart plotters are both operating in Master mode, the C-Link navigation data sent by the other Chart Plotter never processed. Under such condition if the navigation is activated on one of the two Chart Plotters, a warning

message will be shown to notify that the C-Link navigation data will be ignored by the other Chart Plotter.

Slave Chart Plotter

Operating mode

To select the Slave mode follow the procedure:

➤ **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "C-LINK" + [ENTER] + "Secondary Station" + [ENTER]**

When Slave mode is set, the chart plotter cannot manipulate the C-Link navigation data anymore.

Stop current navigation

If the navigation was already active, it will be disabled as soon as Slave mode is set. An appropriate warning message will be shown to notify that the Navigation is already active and to confirm whether Slave mode can be set.

Inhibit Navigation operation

As soon as Slave mode is set, the destination cannot be placed anymore either the C-Link navigation data is received from the Master or not. Also, when the C-Link navigation data is received from the Master, it will not be allowed to deactivate the Navigation.

Inhibit Route following

While navigating to the route received from the Master the destination is reached (either applying distance or perpendicular criteria), the destination will not be moved to the next Waypoint on the route.

MOB handling

If the Navigation to the external destination is active and the MOB key is pressed on the Slave Chart Plotter, the MOB is placed but the navigation to the MOB is not activated.

Notes

While navigating to the external destination the Operating Mode is switched to Master mode, the navigation to the external destination will be terminated. An appropriate warning message will be shown to notify that the Navigation to the external destination is active and to confirm whether Slave mode can be set. Setting Slave mode, the C-Link navigation data will be deleted.
The C-Link navigation data are deleted at Power Off.

C-Link navigation data: Acquisition and Display

As soon as the C-Link navigation data is received, the Slave parses the information received and executes the relative actions depending on its current working status.

Note *When the Navigation to the external Destination is activated, the Slave Chart Plotter will show all relevant C-Link navigation data exactly like when the destination is not the external one: (Destination Name, DST and BRG to Destination, calculate XTE, calculate TTG etc). These values will be displayed all places where required and they will be used to format NMEA-0183 output data.*

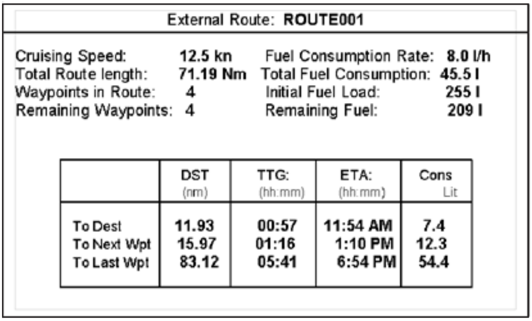
Graphical representation on Map Display

DESCRIPTION	SYMBOL
External Destination - RED Icon	D WPT002
Next Waypoint - GREEN Icon	N WPT003
Navigation Leg - RED Line	

Fig. 5.2 - Graphical Displaying

Route Data Report

When the Navigation to the External Route is received, it will be possible to display the information related to the External Route by entering the Route Data Report.



External Route: **ROUTE001**

Cruising Speed:	12.5 kn	Fuel Consumption Rate:	8.0 l/h
Total Route length:	71.19 Nm	Total Fuel Consumption:	45.5 l
Waypoints in Route:	4	Initial Fuel Load:	255 l
Remaining Waypoints:	4	Remaining Fuel:	209 l

	DST (nm)	TTG: (hh:mm)	ETA: (hh:mm)	Cons Lit
To Dest	11.93	00:57	11:54 AM	7.4
To Next Wpt	15.97	01:16	1:10 PM	12.3
To Last Wpt	83.12	05:41	6:54 PM	54.4

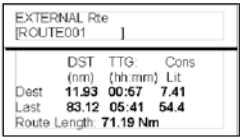
Fig. 5.2a - External route on Route Data Report

External Route	:	Name of the External Route (from PCMPN,0)
Cruising Speed	:	Planned Cruising Speed (from PCMPN,1)
Fuel Consumption Rate	:	Planned Fuel Consumption Rate (from PCMPN,1)
Total Route length Route	:	Length from First to Last Wpt. (from PCMPN,1)
Initial Fuel Load	:	Volume of Fuel available before the navigation was started (Liters)
Total Fuel Consumption	:	Calculated Fuel consumption to navigate the whole route.
Waypoints in Route	:	No. of Wpts in the Route (from PCMPN,1)
Remaining Waypoints	:	No. of Wpts from Dest to Last Wpt (from PCMPN,1)
Distance to Destination	:	Distance from Ship to Destination (Calculated)
Distance to Next Wpt	:	Distance to travel from ship to the Wpt after the Destination (calculated: Distance to Dest + Next Route Leg length)
Distance to Last Wpt	:	Distance to travel from ship to the End of the Route (Calculated: Distance to Dest +Distance From Dest to last Wpt received from PCMPN,1)
TTG To Destination	:	Estimated Time to travel the "*Distance to Last Wpt*". Calculated using Cruising Speed.
TTG To Next Wpt	:	Estimated Time to travel the "*Distance to Next Waypoint*" Calculated using Cruising Speed.
TTG to Last Wpt	:	Estimated Time to travel the "*Distance to Last Wpt*". Calculated using Cruising Speed
ETA to Destination	:	Estimate Time of Arrival to the Destination Point. Cal-

		culated: Current Time + "*TTG To Destination*"
ETA to Next Waypoint	:	Estimate Time of Arrival to the Waypoint after the Destination. Calculated: Current Time + "*TTG To Next Waypoint*"
ETA to Last Wpt	:	Estimate Time of Arrival to the End of the Route. Calculated: Current Time + "*TTG To Last Wpt*"

Quick Info

Route Navigation: Quick Info on the Destination



Route Name, DESTINATION ID Wpt1/4

Distance, TTG and Consumption from Ship to Dest
Distance, TTG and Consumption from Ship to Last Wpt

Fig. 5.2b - Quick Info on Destination

Quick info on Single Destination

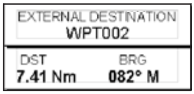


Fig. 5.2c - Quick Info on Single Destination

6. Fish Finder ONLY FOR CM PRO / CM iPRO

The Fish Finder consists of a high power transmitter, sensitive receiver and a transducer. The Fish Finder sends an electrical pulse to the transducer which contains an element that converts the pulse into acoustic (sound) wave which is sent through the water. As this wave travels from the transducer to the bottom, it may strike fish, structures, thermoclines (temperature changes in the water). When the wave strikes an object(s) a certain amount of the wave is reflected back to the transducer depending on the composition and shape of the object. When the reflected wave is returned to the transducer it is converted into a voltage and is amplified by the receiver, processed and sent to the display. The speed of sound in water is roughly 4800 ft./sec, so the time lapse between the transmitted signal and the received echo can be measured and the distance to the object determined.

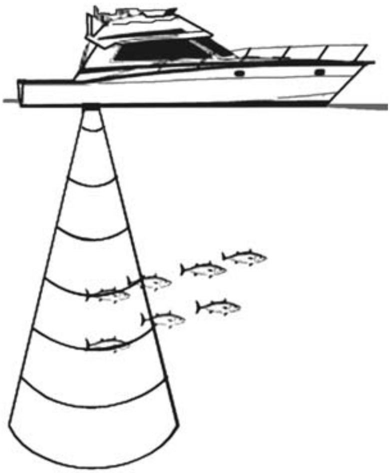


Fig. 6 - Fish Finder working principle

6.1 SETTING THE INTERNAL FISH FINDER ON

The Fish Finder driver is embedded on the chart plotter: it is connected directly to the dedicated serial Port2.
To switch the internal Fish Finder transmission On follow the procedure:

- **[MENU] + "SETUP" + [ENTER] + "Input/Output" + [ENTER] + "FISH FINDER ON/STANDBY" + [ENTER]**

NOTE *It is not possible to connect any external Fish Finder unit to the chart plotter.*

6.2 UNDERSTANDING THE FISH FINDER PAGE

The display on chart plotters shows a history of time of the echoes received by the transducer. The chart plotters have a menu that allows adjustments to receiver sensitivity, depth range and scrolling speed of the Fish Finder display.

1. Warning message
2. Fish Finder Display window
3. Color Bar
4. Digital Depth
5. Water temperature
6. Alarm Bar
7. Depth ruler
8. Variable Depth Marker (VDM)
9. Zoom Bar
10. A-Scope
11. Operating Frequency

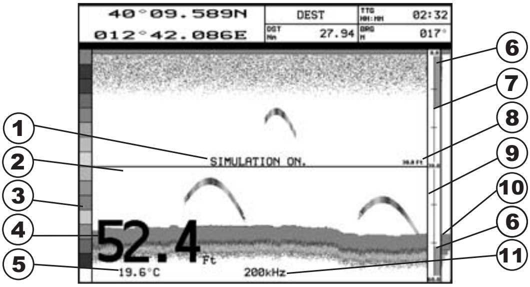


Fig. 6.2 - The Fish Finder page

The following is a short description of terms listed in the previous Fig. 6.2:

① **Warning Message**
Flashing label "Simulation" when the echo sounder is in Simulation mode.

② **Echogram window**
Graphic presentation of sonar soundings recorded as a continuous profile scrolling across the screen from right to left. Such recordings represent the image of the water beneath your boat, items appear as they pass under your transducer; the items on the right side of the screen are closer to you than those on the left. The correct interpretation of the Echogram allows retrieving useful information about what is under the boat. See the following Par. 6.2.2 for more information.

③ **Color Bar**
Colored scale located on the left side of the screen that shows the colors used in the Echogram to represent the echoes strength. The color on the top of the bar represents the maximum sonar strength, while the color on the bottom of the bar represents the minimum sonar strength.

④ **Digital Depth**
Readout of the current bottom depth.

⑤ **Water Temperature**
Readout of the current water temperature returned by the TEMP 1 sensor included into specific transducers.

⑥ **Alarm Bar**
Bar located on the right side of the Depth Ruler, showing the shallow water and deep water alarm values. The alarm is triggered when depth is outside the range.

⑦ **Depth Ruler**
Vertical graduated bar located along the right side of the screen. It is a scale which reflects the depth of the area being displayed.

⑧ **Variable Depth Marker (VDM)**
Horizontal line on to the Echogram window with a depth label. The up/down cursor keys can move it up and down. The label displays the depth of the cursor position. It can be moved to any location pinpointing the depth of a target.

⑨ **Zoom Bar**
Bar located on the left side of the Depth Ruler, showing the portion of the Echogram currently represented in the zoomed window (on the left part of the screen). It is turned On selecting the Echo Sounder Split page.

⑩ **A-Scope**
A real time representation of fish and bottom features passing through the beam of the transducer. It is drawn as horizontal lines whose length and hue is proportional to the sonar strength returned. When the default palette is selected, the strongest sonar returns will be shown as the color displayed of the top of Color Bar while the weakest as the bottom color.

⑪ **Operating Frequency**
Readout of the selected operating frequency.

6.2.2 Understanding the Echogram display

The main elements that can be easily distinguished into an Echogram are:

① Fishes
② Thermoclines
③ White Line
④ Surface Clutter
⑤ Structures
⑥ Bottom Echo Profile

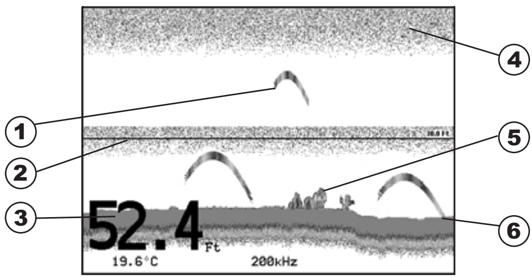


Fig. 6.2.2 - The Fish Finder Echogram

① **Fishes**
Fishes are represented as arcs because of the cone angle of the transducer. In fact as the boat passes over the fish the leading edge of the cone strikes the fish, causing a display pixel to be turned on. As the boat passes over the fish, the distance to the fish decreases turning each pixel on at a shallower depth on the display. When the boat is directly over the fish, the first half of the arch is formed and since the fish is closer to the boat, the signal is stronger and the arch is thicker. As the boat moves away from the fish, the distance increases and the pixels appear at progressively deeper depths forming the remaining half of the arch.

② **Thermoclines**
Are the zones where two layers of different water temperatures meet. The greater the temperature differential, the thicker the thermocline is shown on the screen. Thermoclines are represented as horizontal stripes of noise. They

are very important for fishing since often many species of game fish like to suspend in, just above, or just below the thermoclines.

③ **White Line**
The White Line shows the difference between hard, soft bottoms and even distinguishes between fishes and structures located near the bottom. In this way it is easier to tell the difference between a hard and soft bottom and even to distinguish fishes and structures located nearby the bottom. For example, a soft, muddy or weedy bottom returns a weaker echo that is shown with a narrow white line while a hard bottom returns a strong echo that causes a wide white bottom line.

④ **Surface Clutter**
Appears like noise at the top of the screen extending many feet below the surface. It's caused by many things, including air bubbles, bait fish, plankton and algae.

⑤ **Structures**
Generally, the term "structure" is used to identify objects like wrecks and weeds rising from the bottom.

⑥ **Bottom Echo Profile**
Bottom profile recorded by the Fish Finder. When the echo sounder is set in auto-range mode it is automatically kept in the lower half of the screen.

Other Elements
Large anchoring cables are returned by the echo sounder as very long and narrow arcs on the screen.

6.3 DISPLAYING THE FISH FINDER PAGE

This section will take you through the frequently used operations and assist you to customize the look of the chart plotter using the Fish Finder.

6.3.1 How to select the Fish Finder page

To change the Fish Finder page displayed follow the procedure:

➤ **[PAGE] + select the preferred Fish Finder page + [ENTER]**

6.3.2 Fish Finder Full page

To display the Fish Finder Full Page Echogram, follow this procedure:

➤ **[PAGE] + select the Fish Finder Full page + [ENTER]**

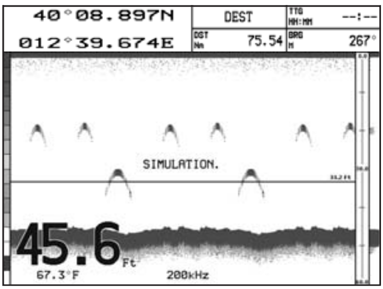


Fig. 6.3.2 - Example of 200kHz Fish Finder Full page

NOTE *The frequency displayed depends on the selection done in the Frequency item (see Par 6.6.7).*

The MENU key
Pressing **[MENU]** activates the Fish Finder Setup menu (see Par. 6.6). Pressing **[MENU]** subsequent times toggles between the Fish Finder Setup menu and the Functions menu.

The Cursor key
Moving the Cursor key up/down adjusts the Variable Depth Marker (VDM) up or down on the screen.

The ENTER key
Pressing **[ENTER]** activates the Sensitivity menu (see Par. 6.6.9) that allows tuning the Gain, the Surface Noise Filter and the STC.



Fig. 6.3.2a - Sensitivity sub-menu

Pressing **[CLEAR]** turns off the Sensitivity menu.

The CLEAR key
By pressing **[CLEAR]** the Variable Depth Marker (VDM) is hidden.

The ZOOM IN and ZOOM OUT keys
From this page pressing **[ZOOM IN]** once changes to Zoom 2X, pressing **[ZOOM IN]** twice changes to Zoom 4X, while pressing **[ZOOM OUT]** reverts to Zoom 2X and no zoom.

6.3.3 Fish Finder 50/200 kHz page

To display the Fish Finder Dual Echogram, follow this procedure:

➤ **[PAGE] + select the Fish Finder 50/200 kHz page + [ENTER]**

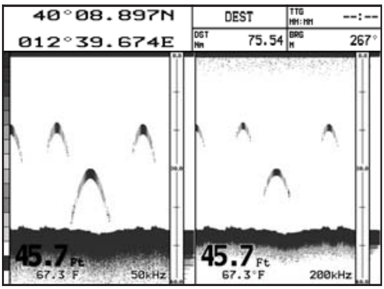


Fig. 6.3.3 - Fish Finder 50/200 mode

The Cursor key
Moving the cursor to the right or the left moves the Variable Depth Marker (VDM) between the 50 and 200kHz displays. Moving the cursor up or down will move the VDM up and down. Press **[CLEAR]** to hide the VDM.

The ZOOM IN and ZOOM OUT keys
From this page pressing **[ZOOM IN]** once changes to Zoom 2X, pressing **[ZOOM IN]** twice changes to Zoom 4X, while pressing **[ZOOM OUT]** reverts to Zoom 2X and no zoom.

6.3.4 Fish Finder Zoom page

To display the zoomed Fish Finder page on the left half of the screen and the unzoomed Fish Finder Echogram on the right half of the screen, follow this procedure:

➤ **[PAGE] + select the Fish Finder Zoom page + [ENTER]**

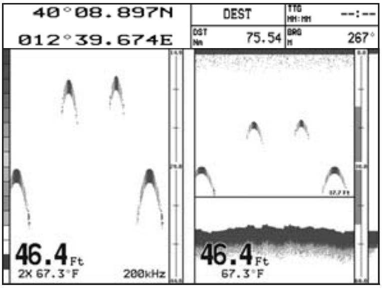


Fig. 6.3.4 - Fish Finder Zoom Page

The Depth Cursor is shown only on the unzoomed Fish Finder Echogram.

The ZOOM IN and ZOOM OUT keys
When in this page pressing **[ZOOM IN]** changes to Zoom 4X, pressing **[ZOOM OUT]** changes to Zoom 2X.

6.3.5 Fish Finder/Chart page

To display the Chart page on the left half of the screen and the Fish Finder Echogram on the right half of the screen, follow this procedure:

➤ **[PAGE] + select the Fish Finder/Chart page + [ENTER]**

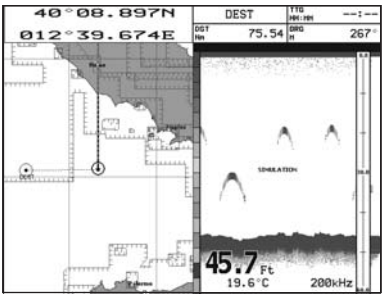


Fig. 6.3.5 - Fish Finder/Chart page

The MENU key (to change the active window)
When in Chart/Fish mode pressing **[MENU]**:

- if the focus (the active window) in on the Chart, the Functions menu is shown. Pressing again **[MENU]** opens the Fish Finder Setup menu and moves the focus to the Fish Finder.

- if the focus (the active window) in on the Fish Finder, the Fish Finder Setup menu is shown. Pressing again **[MENU]** opens the Functions menu and moves the focus to the Chart.

NOTE *When focus is on the Chart page, all keys work in cartography standard mode.*

6.3.6 Fish Finder and Radar page

CAUTION

The following Radar display pages are available only if the Radar is connected and powered On.

To display the Radar page on the left half of the screen and the Fish Finder Echogram on the right half of the screen, follow this procedure:

➤ **[PAGE] + select the Fish Finder/Radar page + [ENTER]**

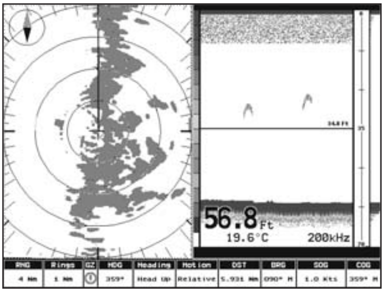


Fig. 6.3.6 - Fish Finder/Radar page

When in Fish Finder/Radar page, the active view is highlighted by a focus (Yellow frame). The keyboard commands are related to that focused view. To move the focus press **[MENU]** twice.

6.4 ZOOM MODES

6.4.1 The Bottom Lock Zoom

The Bottom Lock Zoom mode is activated when the Fish Finder is in Auto Range or Bottom Lock mode (see Par. 6.5.3) and the Variable Depth Marker (VDM) is not displayed on the screen.
In Bottom Lock Zoom mode the Fish Finder Echogram is automatically moved up/down as to keep the Bottom Line always visible in the lower half of the screen.

NOTE *Moving the Cursor key up/down displays the Variable Depth Marker (VDM) switching the Fish Finder in Marker Zoom mode.*

6.4.2 The Marker Zoom

The Marker Zoom mode is activated either when the Fish Finder is in Manual Range mode (see Par. 6.5.3) or the Depth Cursor is displayed on the screen.
In Marker Zoom mode the Fish Finder Echogram position is controlled by moving the Variable Depth Marker (VDM) and pressing and holding **[ENTER]** for 1 second on the selected position. Moving the Variable Depth Marker (VDM) over the top or below the bottom of the screen, automatically moves up/down the current zoomed Echogram view and re-position the Variable Depth Marker (VDM) at the center of the screen.

NOTE *Pressing* ***[CLEAR]*** *hides the Depth Cursor and if the Fish Finder is in Auto Range or Bottom Lock mode switches into Bottom Lock Zoom mode.*

6.5 SOUNDER ADJUSTMENTS WITH SOFT KEYS

When the Fish Finder page is active, by pressing one of the soft keys, the main functions to adjust the Fish Finder are shown on the soft keys labels on the screen. The soft keys labels disappear by pressing **[CLEAR]**.

The GAIN Soft Key

By pressing **[GAIN]** the Gain changes between Auto Gain and Manual Gain.
If Manual Gain, use the cursor left/right to adjust it: a bar with the % symbol is displayed on the screen above the **[GAIN]** label.
If Auto Gain, use the cursor left/right to adjust the Gain Offset: a bar with the % symbol is displayed on the screen above the **[GAIN]** label.

The STC Soft Key

The **[STC]** changes the STC value between Off/Short/Mid/Long/Custom. The current value of STC is shown on a window right over the **[STC]** label.

The RANGE Soft Key

By pressing **[RANGE]** the window switches to the next Range status: Manual, Bottom Lock and Auto.
If Manual, use the cursor up/down to adjust the Depth value by 10Ft time and use the cursor left/right to adjust the Shift. When in meters the step is 2m and it increases to 10m when the key is pressed for more than 1 second.
If Bottom Lock, use the cursor up/down to adjust the Bottom Range value by 10Ft at a time. If Auto Range, the range value is set automatically and it cannot be changed by the user.

The FREQ Soft Key

Pressing **[FREQ]** selects the Frequency to which the Sensitivity parameters are applied.
This option is available in all Fish Finder pages except the Dual Frequency page.

The INT.REJ. Soft Key

Pressing **[INT.REJ.]** selects a filter to remove interference from other Fish Finders.
This option is available only in the Dual Frequency page.

6.6 FISH FINDER SETUP MENU

The Fish Finder Setup menu provides access to additional functions, setup and layout/data field options. From the Fish Finder page, access this menu by pressing:

➤ **[MENU]**

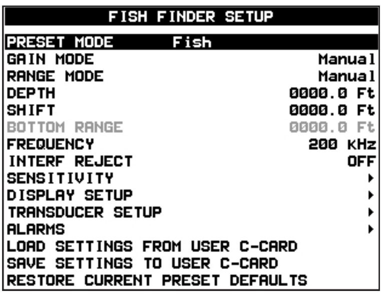


Fig. 6.6 - Fish Finder Setup menu

6.6.1 Preset Mode

Preset modes are pre-defined settings of the Fish Finder operating parameters. You can use them to quickly set the Fish Finder in the most commonly used operating modes. These are Cruise (sets the Fish Finder in full auto mode with the sensitivity settings optimized for displaying at best the bottom) and Fish (sets the Fish Finder in full auto mode with the sensitivity setting optimized for target searching). See the following table.

➤ **[MENU] + "Preset Mode" + [ENTER]**

Fish	: Gain Mode = Auto, Range Mode = Auto, Frequency = do not change, Shift = 0, STC = Short if Freq=200kHz and Mid if Freq=50kHz, Scrolling Speed = 10, Fish Symbols = Echo, A-Scope = On, Surface Noise Filter = Off.
Cruise	: Gain Mode = Auto, Range Mode = Auto, Frequency = do not change, Shift = 0, STC = Short if Freq=200kHz and Mid if Freq=50kHz, Scrolling Speed = 10, Fish Symbols = Echo, A-Scope = On, Surface Noise Filter = 4.

6.6.2 Gain Mode

Selects Auto or Manual.

➤ **[MENU] + "Gain Mode" + [ENTER]**

6.6.3 Range Mode

Selects among Manual, Auto Range and Bottom Lock. When in **Manual Range Mode** it is possible to set Shift (the offset from the surface) (see Par. 6.6.5) and Depth (see Par. 6.6.4) on which the Fish Finder shall operate. When in **Auto Range Mode** the Fish Finder determines automatically the range as to keep the bottom visible in the lower left of the screen. In this mode, Shift is always set to 0. In **Bottom Lock Mode** the Fish Finder automatically tracks the range around the bottom specified by the Bottom Range value.

➤ **[MENU] + "Range Mode" + [ENTER]**

6.6.4 Depth

This option is available only when Range Mode is Manual and it is disabled in Auto Range and Bottom Lock Mode.

➤ **[MENU] + "Depth" + [ENTER]**

6.6.5 Shift

This option is available only when Range Mode is Manual and it is disabled in Auto Range and Bottom Lock Mode.

➤ **[MENU] + "Shift" + [ENTER]**

NOTE *The bottom Range, Depth, Shift will apply to the currently selected frequency.*

6.6.6 Bottom Range

This option is available when Range Mode is Bottom Lock.

➤ **[MENU] + "Bottom Range" + [ENTER]**

6.6.7 Frequency

Allows you to choose the frequency between Auto, 50 kHz or 200 kHz when single frequency page is selected.

➤ **[MENU] + "Frequency" + [ENTER]**

6.6.8 Interference Rejection

Selects a filter to remove interference from other Fish Finders.

➤ **[MENU] + "Interf Reject" + [ENTER]**

6.6.9 Sensitivity Menu

The Sensitivity menu is accessible both from the Fish Finder Setup menu and by pressing **[ENTER]** when in Fish Finder pages. All settings in the Sensitivity menu are related to the Frequency selected.

➤ **[MENU] + "Sensitivity Menu" + [ENTER]**

Frequency[1]	: **ONLY IN THE DUAL FREQUENCY PAGE** Allows you to select the Frequency to which the Sensitivity parameters are applied.
Gain	: Allows you to control the Gain of the unit's receiver. To see more details on the screen, increase the receiver sensitivity by selecting a higher gain percentage. If there is too much detail or if the screen is cluttered, lowering the sensitivity may increase the clarity of the display.
STC	: Sensitivity Time Constant: it is a time varying gain curve which attenuates the sonar receiver gain in shallow water, increasing the gain gradually as the depth increases. This is for the purpose of filtering out surface clutter.
STC Length	: If STC is Custom, it is possible to change the Length of the Sensitivity Time Constant.
STC Strenth	: If STC is Custom, it is possible to change the Strength of the Sensitivity Time Constant.
Surf Noise Filter[2]	: This function implements an advanced time varying filter that allows suppressing the surface clutter efficiently while leaving fish targets visible.

NOTE[1] *The Frequency value is only displayed: to select the desired frequency see the previous Par. 6.6.7.*

NOTE[2] *Thus imposing the capability of the Fish Finder to correctly detect the weakest echoes coming from a very deep bottom.*

6.6.10 Display Setup Menu

The Display Setup Menu allows you to change the color scheme of the Fish Finder display, adjusts the chart scrolling rate, enables or disables the White Line and allows determining the graphical representation of fishes.

➤ **[MENU] + "Display Setup" + [ENTER]**

Color Settings	: Allows you to change the color scheme of the Fish Finder display. The available colors are Blue Background, White Background, Black Background, Gray Scale and Reversed Gray Scale.
Scrolling Speed	: Adjusts the chart scrolling rate. Note that the scrolling rate is limited by the sound speed and the depth according with the following relation: the deeper the setting, the slower the scrolling rate. 100% is the maximum possible.
White Line	: Controls how the chart plotter displays information about the bottom type (hard or soft).
Fish Symbols	: Allows determining the graphical representation of underwater suspended targets: Echo/Echo+Icon/Echo+Icon+Depth/Echo+Depth/Icon/Icon+Depth. The Fish icons displayed are among four different shapes depending on the size of the Target (Small, Med, Big, Huge).
Water Temperature	: Allows you to choose the Water Temperature label displayed over the echogram between Primary and External.

6.6.11 Transducer Setup Menu

The Transducer Setup menu contains settings that does not require frequent changes.

➤ **[MENU] + "Transducer Setup" + [ENTER]**

Keel Offset	: It is the transducer depth offset from the surface. This makes it possible to measure depth from the surface instead of from the transducer's location.
Calibrate Sound Speed	: Allows calibrating the value of Sound Speed in the water, depending on the water temperature and salinity.
Calibrate Water Speed	: Allows calibrating the value of Water Speed sensor. The calibration value, in the range between -10% to +10%, will be applied to the water speed from the transducer.

Calibrate Water Temperature	:	Allows the calibration on the Water Temperature sensor. Using the readings from a precise temperature measuring device, insert here a positive/negative offset to display right value on Fish Finder screens.
Calibrate Aux Temperature	:	Allows the calibration of the Aux Temperature sensor. Using the readings from a precise temperature measuring device, insert here a positive/negative offset to display right value on FF screens.
Restore Defaults	:	Restores the default values

6.6.12 Alarms Menu

The Alarms menu allows you to define additional sonar alarm settings for Fish Alarm, Shallow Alarm, Depth Alarm and Temperature Upper/Lower/Rate.

➤ **[MENU] + "Alarms" + [ENTER]**

Shallow Water	:	Triggers an alarm when depth becomes shallower than the value set.
Deep Water	:	Triggers an alarm when depth becomes deeper than the value set.
High Water Temp	:	Triggers an alarm when the transducer reports a temperature (from TEMP 1 sensor) above the value set.
Low Water Temp	:	Triggers an alarm when the transducer reports a temperature (from TEMP 1 sensor) below the value set.
Water Temp Rate	:	Triggers an alarm when the transducer reports a temperature (from TEMP 1 sensor) variation rate above the value set.
Fish Alarm	:	The options for Fish Alarm set the size of the fishes that, if detected by the unit, switches an alarm to sound. These options are: Off, Small, Medium, Big and Huge. The alarm sounds if the set size (or bigger) is detected.

6.6.13 Load Settings from USER C-CARD

Insert the USER C-CARD into the slot, then follow the procedure:

➤ **[MENU] + "LOAD SETTINGS FROM USER C-CARD" + [ENTER]**

Load the complete settings from the USER C-CARD and changes the active menu settings.

6.6.14 Save Settings to USER C-CARD

Insert the USER C-CARD into the slot, then follow the procedure:

➤ **[MENU] + "SAVE SETTINGS TO USER C-CARD" + [ENTER]**

This is useful to avoid the user having to retune up Fish Finder after a Clear RAM operation or a software update.

6.6.15 Restore Current Preset Defaults

➤ **[MENU] + "RESTORE CURRENT PRESET DEFAULTS" + [ENTER]**

Restores the default values only for the current presets (see Par. 6.6.1, Preset Mode) and does not affect the other presets.

6.7 TRANSDUCERS

The transducer is a device that transmits and receives sound waves into the water. The active component inside the transducer is commonly referred to as an element but actually is a piezoelectric ceramic material.
Please refer to your dealer and/or installer to choose your transducer. Interphase suggest **AIRMAR** transducers.

7. Maintenance

This chapter gives information on routine maintenance and problem solving associated with the chart plotter.

7.1 SYSTEM TEST

If you have connected your position-finding device according to the instructions, and chosen the proper menu selection for your device, and are still having problems with your chart plotter, the extended auto-test should help determine the problem. Make sure the chart plotter is turned Off. While pressing and holding any other key, turn the chart plotter On. A new menu will appear on the display. Use the cursor key to select the desired test: this will display in reverse video. To choose the test press [ENTER]. To exit from any submenu press [CLEAR]. To exit from the System Test turn Off the chart plotter.

RAM Menu

RAM Test: Verifies the integrity of the RAM chips. If on the screen the message "ERROR" appears, the RAM is physically damaged.
RAM Clear: Clears internal memory. If the chart plotter exhibits unusual behaviour, or appears to be malfunctioning, it may be possible to correct the problem by clearing RAM. This operation will erase all Marks, Routes, stored Track plots and destinations. It will also return all selections (Input Data Format, Autopilot selection, etc.) to original default values. Before this step, you have the option of saving user Marks, Track history and Routes to a User C-CARD (this is an optional purchase from your dealer). To confirm to clear RAM press [ENTER] again (but if this time you do not wish to clear RAM press [CLEAR]).

DIM Menu

Contrast: Each time you press the cursor key to right, the screen will decrease brightness, when you press the left key the brightness will increase.
Backlight: Sets the backlight. It operates in similar mode as Contrast.

Cartridges

Internal DataBase Test: Tests the WorldWideBackground.
C-CARD Test: Tests the C-CARD. There are four possible situations:

- If there is a C-CARD inserted in the slot and there is not a malfunction, the name of the C-CARD zone and the message "OK" are shown
- If there is a C-CARD inserted in the slot, but it is damaged C-CARD, the name of the C-CARD zone and/or the message "Faulty" are shown
- If there is not any C-CARD inserted in the slot, the message "not present" is shown
- If there is a User C-CARD inserted in the slot, the message "USER C-CARD" is shown

C-CARD Connector: While a C-CARD is inserted in the slot, if the counter increases, there is a malfunction reading it.

Serial Ports

Change parameters: Changes the parameters of the serial interface. This menu

allows to select the **Port** (Signal Source), the **Baud Rate** between 4800 or 9600, the **Data Bits** (Word Length) between 7 or 8, the **Parity** between even, odd or none, the **Stop Bits** between 1 or 2.
Input Data Display: Allows the chart plotter to act as a computer terminal and display the incoming data exactly as it is received. If the data displayed on the screen is unrecognizable, you may have selected the wrong input parameters for your particular receiver. Check your receiver manual to be sure that you have selected the proper interface format. If the screen is blank, you may have a broken connection, and no data is being received.

Modem test

Checks the Modem connections. Press [ENTER] to select the desired Port related to the connections made, to the Port to which the Modem C-COM is connected.

8. Terms

- **ALT = Altitude**
  Altitude of GPS Antenna on the medium sea level.
- **Alter = Alternate Solution (TD Coordinates System)**
  Parameter selected by the user that is applied in the conversion of TD values to geographical coordinates Lat/Lon. It defines which of the two possible solutions can be used.
- **Arrival Time**
  The estimated time of day you will reach your destination, based on your current Speed and Track from GPS.
- **ASF = Additional Secondary phase Factor (TD Coordinates System)**
  Correction to TD values which can be inserted by the user.
- **Azimuth**
  The angular measurement from the horizon to a satellite or another object.
- **AWD = Apparent Wind Direction**
  The Direction from which the Wind appears to blow relative to a moving point (also called Relative Wind Direction).
- **AWS = Apparent Wind Speed**
  The Speed at which the Wind appears to blow relative to a moving point (also called Relative Wind Speed).
- **Beacon**
  A prominent, specially constructed object forming a conspicuous vertical mark as a fixed aid to navigation.
- **Buoy**
  A floating object moored to the sea bottom in a particular (charted) place, as an aid to navigation.
- **Buoys and Beacons**
  Buoys and Beacons are used to indicate to mariners recommended or established routes, underwater dangers, restrictions and regulations. They can be lighted or not and are colored according to their international code.
- **BRG = Bearing**
  It is the angle between the North (True or Magnetic) and a destination. The horizontal direction of one terrestrial point from another referring to the North (True or Magnetic). It is often used to indicate the direction to follow to reach the destination.
- **Chain (Loran-C GRI)**
  The Loran chains are groups of transmitting stations that use timed radio pulse transmissions. In each of these chains there is a master station and two or more slave or secondary stations. Stations belonging to a same chain transmit pulses in timing groups: a different time base identifies each chain. The time base of each chain is the Group Repetition Interval or GRI. This GRI identifies the chain in unique mode. For example the GRI = 4990 identifies the chain of Central Pacific zone.
- **COG = Course Over Ground**
  Direction of the path over ground actually followed by a vessel.
- **CTS = Course To Steer**
  The optimum direction the boat should be steered in order to efficiently make headway back to the courseline while also proceeding toward the destination Waypoint.

- **Cultural Features**
  Any man-made topographic feature as built-up area, buildings, roads.
- **Datum**
  The Latitude and Longitude lines printed on any map are based on certain models of the shape of the earth: these models are called Datum or Coordinate Systems. There are many different Datum in use, each one gives different Lat/Lon positions for an identical point on the surface of the earth (see also Map Datum and Fix Datum).
- **Dead Reckoning**
  It is the procedure to determine the current position of a vessel by applying to the last known position the way that has been made (since the last known position was received). This procedure is normally based on the last received GPS position, Speed and Course or to the last received GPS position, Log Speed and Heading.
- **Default**
  It indicates the original factory setting for any menu selection. The default values are set after a Master Reset (RAM Clear).
- **Depth Areas**
  Depth Areas are the sea areas included in the user selectable range of minimum and maximum depth limits. The sea area that is **beyond** the selected range is filled by an uniform white color, the sea area that is **inside** the selected range is filled by ordinary multicolor shading. The Spot Soundings and Depth Contours are displayed on the range only.
- **Depth Line**
  (Also called Bathymetric Line) It is the imaginary line connecting points of equal water depth.
- **Destination**
  In order to tag on the chart the point, towards which the ship is Heading, you can use a special mark, called destination. When the destination is placed, all navigation data referred to this point.
- **DGPS = Differential GPS**
  Provides even greater positioning accuracy than standard GPS.
- **DPT = Depth from Trasducer**
  Water Depth below the Trasducer. The Distance from the Depth Transducer to the ground.
- **DST = Distance**
  The geographical distance between two points on the map. It is possible to select the unit among Nm, Sm and Km.
- **ETA = Estimated Time of Arrival**
  The predicted time of reaching a destination or Waypoint
- **File**
  Collection of information (of the same type) stored on a User C-CARD. Each file must have a unique name, ideally one that describes its contents. Filenames are kept in a directory on each User C-CARD.
- **Fix**
  It is the current position of the vessel provided by the GPS (connected to the chart plotter or built-in) or other positioning systems.
- **Fix Status**
  It indicates the quality of the position fix signal.
- **Fuel Consumption Rate**
  It represents the estimated fuel consumption rate (per hour) of an engine boat referred to its relative estimated cruising speed.
- **Goto**
  It is the function that defines the destination point and activates the naviga-

tion to it. The destination can be placed on any location of the map, an existing Mark point or on a pre-defined Route.

- **GPS = Global Positioning System**
  It is a satellite based navigation system operated by the US Department of Defense. It gives the navigator a position 24 hours a day, 365 days a year under any weather conditions.
- **GNSS = Global Navigation Satellite System**
  It is the name used to indicate any single or combined navigation system based on satellites. The current available satellites systems are: GPS, GLONASS and the combined GPS and GLONASS.
- **HDG = Heading**
  The horizontal direction in which a ship actually points or heads in any moment (see also COG).
- **HDOP = Horizontal Dilution Of Precision**
  It is a parameter indicating the precision of the positioning system (GPS). The smaller HDOP value indicates higher position accurately.
- **Home mode**
  All operations refer to the ship's position.
- **Landmarks**
  Landmarks are any prominent object such as monument, building, silo, tower, mast, ..., on land which can be used in determining a location or a direction.
- **Latitude**
  The angular distance North or South of the equator measured by lines encircling the earth parallel to the equator in degrees from 0° to 90°.
- **LAT/LON**
  Coordinate system using Latitude and Longitude coordinates to define a position on earth.
- **Light Sectors**
  It is possible to set On/Off the display of Light Sectors of all the Fixed Lights, Buoys and lighthouses. When Lights are on, lights are shown on lighthouses and other lights that rotate, a light sector is displayed to show the range of coverage for the light.
- **LOG Speed**
  Speed of the vessel relative to the water, provided by an instrument with a submerged transducer for measuring the distance/speed travelled by the vessel.
- **Longitude**
  The angular distance East or West of the prime meridian (Greenwich meridian) as measured by lines perpendicular to the parallels and converging at the poles from 0° to 180°.
- **Loran**
  It is a positioning system which determines the current position of the vessel by measuring the difference in the times of reception of synchronized radio pulse signals transmitted by two or more fixed stations.
- **Magnetic Deviation**
  The value, expressed in degrees East or West that indicates the direction in which the north indicator on the compass card is offset from the magnetic north (the difference expressed in degrees East or West between the compass north and the magnetic north).
- **Magnetic Variation**
  The angle between the magnetic and geographic meridians at any place, expressed in degrees West or East to indicate the direction of magnetic North from true North. It changes from point to point, and (at the same point) with time.
- **Mark**
  Reference point related to cursor position. Typically it represents by an icon

and label under Mark.

- **Natural Features**
  Any topographic feature formed by the action of natural processes: coastlines, relief, glaciers.
- **Navigate mode**
  Operating mode (called also Home mode): all operations refer to the ship's position. Navigate or Navigation mode is also used to indicate that the destination is placed.
- **NMEA-0183**
  The NMEA-0183 Data Interface Standard was developed by the National Marine Electronics Association of America. It is an international standard that enables equipment from many different manufactures to be connected together and share information.
- **OSGB = Ordinance Survey of Great Britain**
  A coordinate system describing only Great Britain charts. Generally used with GBR36 datum, which also describes only Great Britain charts. This coordinate system cannot be used in any other part of the world.
- **Pair**
  The two selectable secondary stations, of a Loran-C chain, which are used to calculate the TD (Time Difference) position of a point in the map area covered by the selected Loran-C chain.
- **Pictures & Diagrams**
  The MAX data format allows assigning one or more image to any cartographic object. These *Pictures* are typically used to facilitate the identification of cartographic objects or places around the map: they can be the landscape layout nearby a harbour, the shape of a bridge or of a buoy etc. On some objects, such as bridges, the image associated can represent the *Diagram* representing the shape of the objects and the various characteristics (length, height, type of bridge etc.).



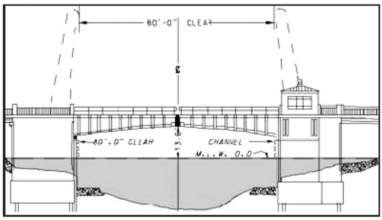


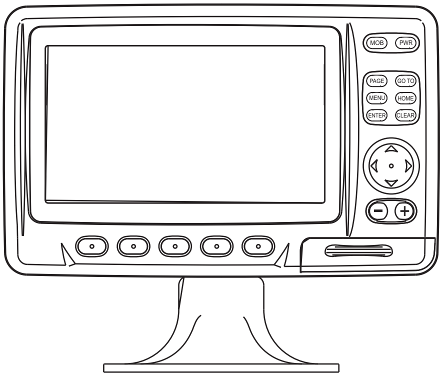
Fig. 8 - Pictures and Diagrams

- **Port Info**
  The Port Info function is a combination of a Port Info database containing all the relevant Safety and Navigational information normally found in good pilot books and a presentation software which displays special Port Facility Symbols.
- **Ports + Services**
  Areas along shore with facilities for mooring, downloading and uploading of ships, generally sheltered from waves and winds. Port installations are piers, wharves, pontoons, dry docks, cranes... .
- **Route**
  Sequence of Waypoints connected by segments (Route Legs). Among the available Routes, only one is the Active Route, which is shown by a straight line and arrows to indicate the direction.
- **RTCM = Radio Technical Commission for Maritime Services**
  The data format created by the Radio Technical Commission Maritime to transmit Differential GPS corrections.

- **SNR = Signal to Noise Ratio**
  It is the ratio between the magnitude of a radio signal and the magnitude of the noise (that is, the interferences). The SRN is expressed in decibels and it is associated to the GPS satellites signal quality.
- **SOG = Speed Over Ground**
  The current velocity at which the vessel is travelling, relative to a ground location. The SOG is normally provided by the GPS sensor.
- **SPD = Speed Through Water**
  The speed of the vessel relative to the water.
- **Spot Sounding**
  It is the depth of the water in a specific and charted position. It is represented on the map by its own value expressed in the current depth unit.
- **STR = Steering**
  The difference between COG and CTS. If COG is 25° and CTS is 30°, then STR is 5° Right.
- **TD = Time Difference**
  Loran positions are determined by precise timing of the intervals between reception of pulses transmitted by pairs of stations in the selected chain. Between any two stations a ship must be located somewhere along a line of possible positions where the measured Time Difference, TD, between arrival of pulses from those stations would be observed. The TD is measured from the time of reception of the master station signal to the time of reception of the slave station signal (see also Pair).
- **Tide**
  The periodic rise and fall of the surface of oceans, bays, etc., due principally to the gravitational interactions between the Moon and Earth.
- **Tide Info**
  The Tide Info feature is the combination of a new tide heights database that will be included within new C-CARDs and new features which calculate the tide graph for all primary and secondary ports world-wide. This function can calculate the tide heights for any past or future date and as a by-product of this calculation will also display the Maximum and Minimum Tide height and time for the day selected plus the times of Sunrise and Sunset. At some chart levels, the chart plotter will display a new Tide Diamond Symbol for every Port or tide point in the database covered by that particular C-CARD.
- **Tracks + Routes**
  Recommended and established routes for ships at sea, including traffic separation schemes, deep water routes.
- **TRN = Turning**
  The difference between COG and BRG. If COG is 80° and BRG is 75°, TRN is 5° Left.
- **TTG = Time To Go**
  The estimated time needed to reach your destination, based on your current speed and the distance to destination.
- **TWD = True Wind Direction**
  Direction of the Wind relative to a fixed point on the earth.
- **TWS = True Wind Speed**
  Velocity of the Wind relative to a fixed point on the earth.
- **Underwater Objects**
  Objects like obstruction, wreck, cable...
- **User Point**
  Object you place on the chart identified by its coordinates and displayed on the screen with a reference symbol (see Mark, Waypoint).

- **UTC = Universal Time Coordinated**
  A time scale based on the rotation of the earth that is used by most broadcast time services.
- **UTM = Universal Transverse Mercator**
  Metric Grid system used on most large and intermediate scale land topographic charts and maps.
- **Variation**
  The angle between the magnetic and geographic meridians at any place, expressed in degrees West or East to indicate the direction of magnetic North from true North. It changes from point to point, and (at the same point) with time.
- **VMG= Velocity Made Good**
  It is the destination closing Velocity. The VMG is calculated using the current speed of the vessel (SOG) and the difference between the current vessel course and the bearing to the destination.
- **WAAS = Wide Area Augmentation System**
  The Federal Aviation Administration (FAA), in cooperation with other DOT organizations and DOD, is augmenting the GPS/SPS with a satellite-based augmentation system, the WAAS. It will provide a signal-in-space to WAAS users to support en route through precision approach navigation. After achieving initial operational capability, the WAAS will then be incrementally improved over the next years to expand the area of coverage, increase the availability of precision approaches, increase signal redundancy and reduce operational restrictions.
- **Waypoint**
  Any point to which one intends to navigate. A sequence of Waypoints makes up a Route plan.
- **WGS-84 = World Geodetic System 1984**
  Coordinates System or Datum developed by the Defense Mapping Agency (DMA). It is the default geodetic Datum used by the chart plotter and the GPS.
- **Zoom-In**
  Shows more detail in a smaller area.
- **Zoom-Out**
  Operates similarly to zoom -in, but in the reverse, showing a wider but less detailed view.
- **XTE = Cross Track Error**
  The distance from the ship's present position to the closest point on a line between the origin and destinations Waypoints of the navigation.

CHART MASTER 169CS/169CSI



FEATURES & FUNCTIONS

- Direct Sunlight Viewable Color LCD 16/9 Display
- Worldwide Built-in Cartography showing C-MAP BY JEPPESEN detail up to 2.0 NM
- "C-MAP BY JEPPESEN" MAX electronic charts, object-oriented chart system with enhanced functionality including:
  - Guardian alarm, Safety toolbar, Safety route check
  - Perspective view
  - Satellite image coverage
  - Turbo and Smooth Zoom
  - Multilanguage
  - Enhanced Port information database
  - Tides & Currents data
  - Photos & Diagrams
  - Automatic information on all chart objects
  - Search function for ports, tidal information, service facilities
- Positional information from GPS
- GPS Signal Status page
- Navigation Data pages
- 500 Waypoints/Marks and 25 Routes (50 Waypoints max per Route)
- Create, Move, Insert, Edit or Erase Waypoint
- Create, Move, Edit or Erase Mark
- Navigation to Destination
- Create, Save, Name, Send/Receive, Edit or Follow a Route
- Route Data Report and User Points (Marks/Waypoints) List pages
- Find Ports Services, Ports By Name, Ports By Distance, Tide Stations, Wrecks, Obstructions, Cursor, POIs, Lakes By Name, Lakes Informations, Coordinates or User Points
- Automatic Info on User Points
- Display vessel's position, direction and Track
- Alarms Handling
- Man OverBoard (MOB) to navigate back to a missing person or object
- Simulation Mode with cursor control

TECHNICAL SPECIFICATIONS

- Power consumption : 630mA max @ 10V
- Power supply : 10 - 35 Volt dc, 7.5 Watt max
- Interface : NMEA0183
- Autopilot Interface : NMEA-0180, NMEA-0180/CDX, NMEA-0183
- Display : Sun Light Viewable Color LCD *(active area 7")*
- Display Resolution : 480 x 234 pixels
- Cartography : C-MAP BY JEPPESEN C-CARD
- Operating temperature range : 0°/+55° C
- Memory : Non volatile with battery back-up
- Keyboard : Silicon rubber, backlight
- Weight : Kg 1,1

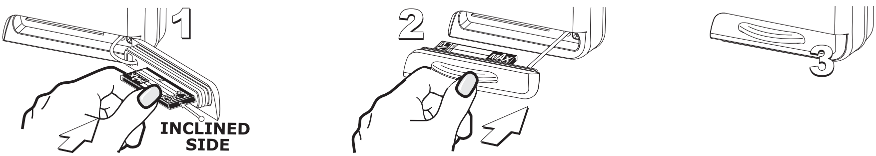
When the package containing the chart plotter is first opened, please check it for the following contents (if any parts are missing contact the dealer the chart plotter was purchased from):

- External bracket and I/O cable 1,5 mt/5,9 feet
- Chart plotter's protective cover
- Fuse 2 Amp. + fuseholder
- User Manual
- Flush mounting kit (CM 169CS)
- Smart DGPS WAAS Receiver with cable 15 mt/45 feet (CM 169CS)

C-CARD INSERTING/REMOVING PROCEDURE

Inserting the C-CARD

Open the door, hold the C-CARD by the long side so that you can see the label and gently push the C-CARD into the door slot (1). Close the door pushing the C-CARD in as far as it will go to hold fixed into the chart plotter slot (2). When finished the door must be right closed (3).



Removing the C-CARD

To remove the C-CARD inserted in the chart plotter open the door (1). The C-CARD will eject out of the chart plotter slot remaining fixed into the door (2). Then remove the C-CARD from the slot (3).

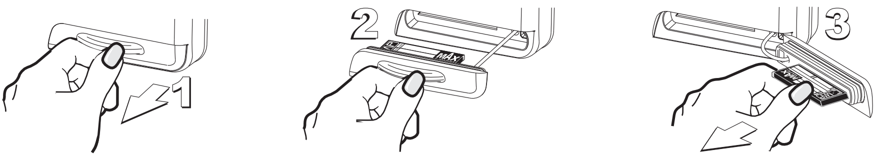
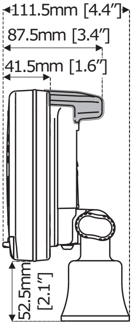
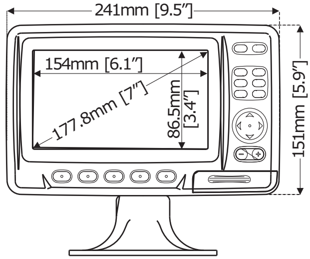


CHART PLOTTER DIMENSIONS

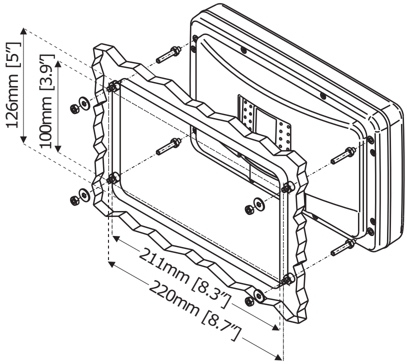
GRAY parts are present ONLY on chart plotter WITH INTERNAL GPS

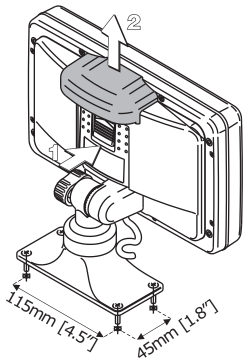




INSTALLATION AND REMOVING

GRAY parts are present ONLY on chart plotter WITH INTERNAL GPS





Flush mount installation for Chart Master 169CS and Bracket installation for Chart Master 169CS / 169CSi

EXTERNAL WIRING

QUICK DISCONNECT BRACKET CABLE	
WIRE COLOR	**DESCRIPTION**
BLACK	PWR-/GND/COMMON
RED	POWER+ 10-35Vdc
WHITE	INPUT 1+
GREEN	COMMON
YELLOW	OUTPUT 1+
BROWN	INPUT 2+
GRAY	OUTPUT 2+
ORANGE	INPUT 3+
PINK	OUTPUT 3+
BLUE	COMMON

External Wiring for CM 169CS

QUICK DISCONNECT BRACKET CABLE	
WIRE COLOR	**DESCRIPTION**
BLACK	PWR-/GND/COMMON
RED	POWER+ 10-35Vdc
WHITE	INPUT 1+
GREEN	COMMON
YELLOW	OUTPUT 1+
BROWN	INPUT 2+
GRAY	OUTPUT 2+
ORANGE	RTCM 104 INPUT
PINK	OUTPUT 3+
BLUE	COMMON

External Wiring for CM 169CSI

TYPICAL CONNECTIONS

Autopilot Connection

QUICK DISCONNECT BRACKET CABLE	
WIRE COLOR	**DESCRIPTION**
BLACK	PWR-/GND/COMMON
RED	POWER+ 10-35Vdc
WHITE	INPUT 1+
GREEN	COMMON
YELLOW	OUTPUT 1+
BROWN	INPUT 2+
GRAY	OUTPUT 2+
ORANGE	INPUT 3+
PINK	OUTPUT 3+
BLUE	COMMON

AUTOPILOT DEVICE
FUNCTION
NMEA0183/180/180CDX/INPUT+
SIGNAL RETURN

Autopilot Connections on Port 2

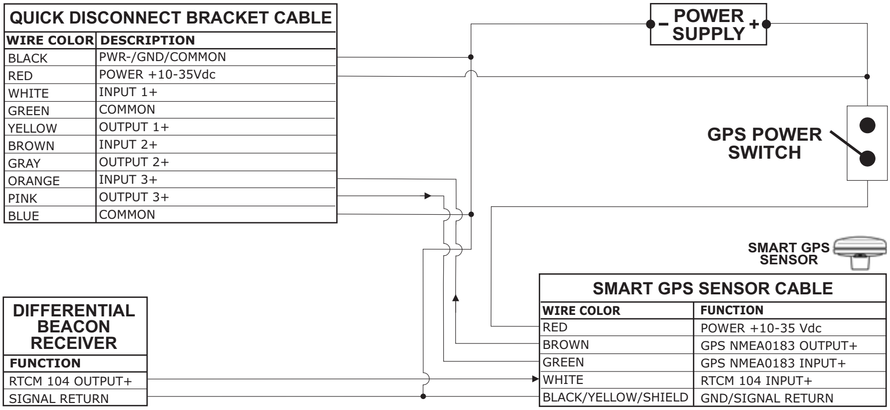
External NMEA Connection

QUICK DISCONNECT BRACKET CABLE	
WIRE COLOR	**DESCRIPTION**
BLACK	PWR-/GND/COMMON
RED	POWER+ 10-35Vdc
WHITE	INPUT 1+
GREEN	COMMON
YELLOW	OUTPUT 1+
BROWN	INPUT 2+
GRAY	OUTPUT 2+
ORANGE	INPUT 3+
PINK	OUTPUT 3+
BLUE	COMMON

NMEA0183 DEVICE
FUNCTION
NMEA0183 OUTPUT+
NMEA0183 INPUT+
SIGNAL RETURN

External NMEA Connections on Port 1

GPS Connection For CM 169CS



QUICK DISCONNECT BRACKET CABLE	
WIRE COLOR	**DESCRIPTION**
BLACK	PWR-/GND/COMMON
RED	POWER +10-35Vdc
WHITE	INPUT 1+
GREEN	COMMON
YELLOW	OUTPUT 1+
BROWN	INPUT 2+
GRAY	OUTPUT 2+
ORANGE	INPUT 3+
PINK	OUTPUT 3+
BLUE	COMMON

DIFFERENTIAL BEACON RECEIVER
FUNCTION
RTCM 104 OUTPUT+
SIGNAL RETURN

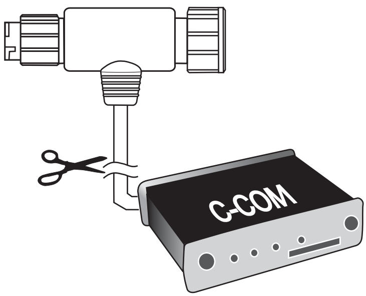
SMART GPS SENSOR CABLE	
WIRE COLOR	**FUNCTION**
RED	POWER +10-35 Vdc
BROWN	GPS NMEA0183 OUTPUT+
GREEN	GPS NMEA0183 INPUT+
WHITE	RTCM 104 INPUT+
BLACK/YELLOW/SHIELD	GND/SIGNAL RETURN

GPS Connections on Port 3

C-COM GSM Plus Connection

To connect the modem C-COM to the chart plotter with quick disconnect bracket follow the procedure:

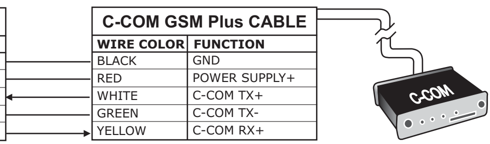
1. Cut the C-COM cable about 5 cm from the "T" connector:



2. Connect the wires to the quick disconnect bracket cable as follows:

QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	**DESCRIPTION**	**FUNCTION**
BLACK	POWER GND	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT 1+	C-COM
GREEN	COMMON	C-COM
YELLOW	OUTPUT 1+	C-COM

C-COM GSM Plus CABLE	
WIRE COLOR	**FUNCTION**
BLACK	GND
RED	POWER SUPPLY+
WHITE	C-COM TX+
GREEN	C-COM TX-
YELLOW	C-COM RX+



Connection for the port 1

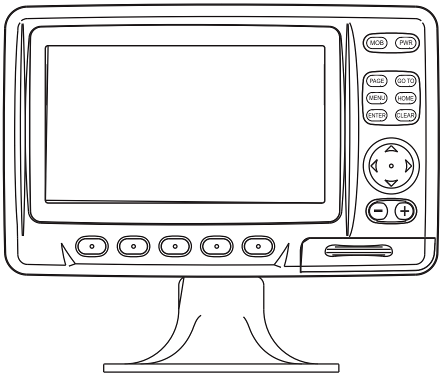
Beacon Receiver Connection For CM 169CSI

QUICK DISCONNECT BRACKET CABLE	
WIRE COLOR	**DESCRIPTION**
BLACK	GND/COMMON
RED	POWER+ 10-35Vdc
WHITE	INPUT 1+
GREEN	COMMON
YELLOW	OUTPUT 1+
BROWN	INPUT 2+
GRAY	OUTPUT 2+
ORANGE	INPUT 3+
PINK	OUTPUT 3+
BLUE	COMMON

DIFFERENTIAL BEACON RECEIVER
FUNCTION
RTCM 104 OUTPUT+
SIGNAL RETURN

Beacon Receiver Connection

NOTE *For CM 169CS: To connect a Differential Beacon Receiver see previous figure "GPS Connection (CM 169CS)"*



FEATURES & FUNCTIONS

- Direct Sunlight Viewable Color LCD 16/9 Display
- Worldwide Built-in Cartography showing C-MAP BY JEPPESEN detail up to 2.0 NM
- "C-MAP BY JEPPESEN" MAX electronic charts, object-oriented chart system with enhanced functionality including:
  - Guardian alarm, Safety toolbar, Safety route check
  - Perspective view
  - Satellite image coverage
  - Turbo and Smooth Zoom
  - Multilanguage
  - Enhanced Port information database
  - Tides & Currents data
  - Photos & Diagrams
  - Automatic information on all chart objects
  - Search function for ports, tidal information, service facilities
- Positional information from GPS
- GPS Signal Status page
- Navigation Data pages
- 500 Waypoints/Marks and 25 Routes (50 Waypoints max per Route)
- Create, Move, Insert, Edit or Erase Waypoint
- Create, Move, Edit or Erase Mark
- Navigation to Destination
- Create, Save, Name, Send/Receive, Edit or Follow a Route
- Route Data Report and User Points (Marks/Waypoints) List pages
- Find Ports Services, Ports By Name, Ports By Distance, Tide Stations, Wrecks, Obstructions, Cursor, POIs, Lakes By Name, Lakes Informations, Coordinates or User Points
- Automatic Info on User Points
- Display vessel's position, direction and Track
- Alarms Handling
- Man OverBoard (MOB) to navigate back to a missing person or object
- Simulation Mode with cursor control
- Internal Fish Finder

TECHNICAL SPECIFICATIONS

- Power consumption : 12W average; 27W max peak
- Power supply : 10 - 35 Volt dc
- Interface : NMEA0183
- Autopilot Interface : NMEA-0180, NMEA-0180/CDX, NMEA-0183
- Display : Color Sunlight Viewable LCD *(active area 7")*
- Display Resolution : 800 x 480 pixels
- Cartography : C-MAP BY JEPPESEN C-CARD
- Operating temperature range : 0°/+55° C
- Memory : Non volatile
- Keyboard : Silicon rubber, backlight
- Weight : Kg 1,3

FF MODULE 600W-50-200KHZ TECHNICAL SPECIFICATIONS

- Power Output : 600W (4800Wpp), 50/200KHz Dual Frequency
- Max Depth : 213m (700Ft) at 200kHz, 457m(1500Ft) at 50kHz
- Automatic Recognition of the AIRMAR "X-DUCER ID" transducers for best performance
- Advanced Digital Signal Processing
- Speed & Temperature Sensor (if available on transducer)
- Alarms (shallow water, depth, Fish, temp)
- Trip Log, Fish Symbols
- STC, Interference Rejection, Automatic noise reduction
- A-scope, White Line, Zoom x2/x4
- Auto range/gain/frequency/shift/ping rate

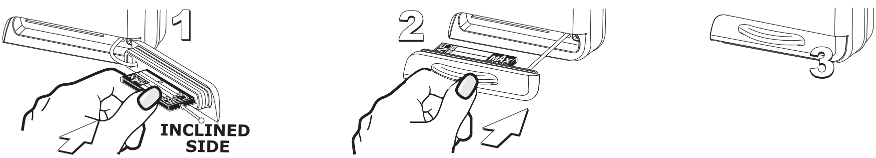
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- External bracket and I/O cable 1,5 mt/5,9 feet
- Chart plotter's protective cover
- Fuse 3 Amp. + fuseholder
- User Manual
- Flush mounting kit
- Smart DGPS WAAS Receiver with cable 15 mt/45 feet (CM PRO)

C-CARD INSERTING/REMOVING PROCEDURE

Inserting the C-CARD

Open the door, hold the C-CARD by the long side so that you can see the label and gently push the C-CARD into the door slot (1). Close the door pushing the C-CARD in as far as it will go to hold fixed into the chart plotter slot (2). When finished the door must be right closed (3).



Removing the C-CARD

To remove the C-CARD inserted in the chart plotter open the door (1). The C-CARD will eject out of the chart plotter slot remaining fixed into the door (2). Then remove the C-CARD from the slot (3).

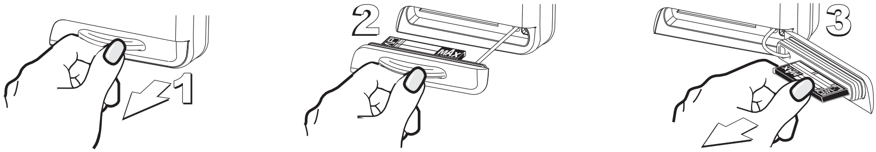
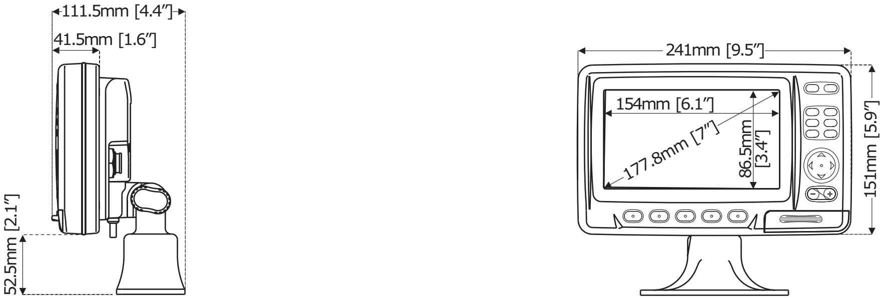
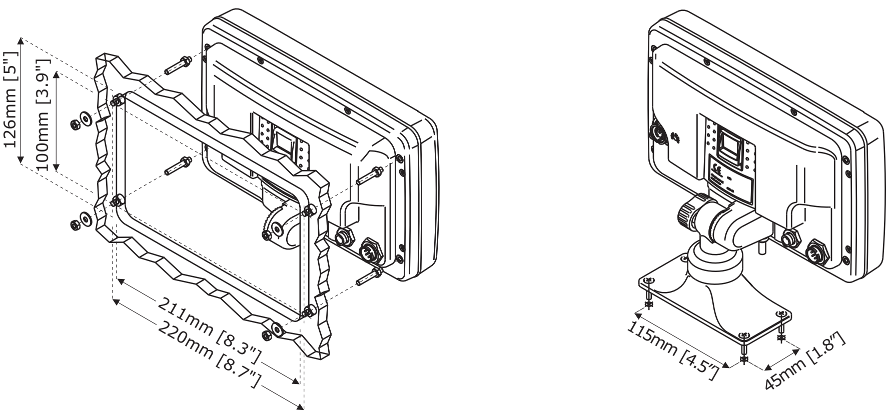


CHART PLOTTER DIMENSIONS

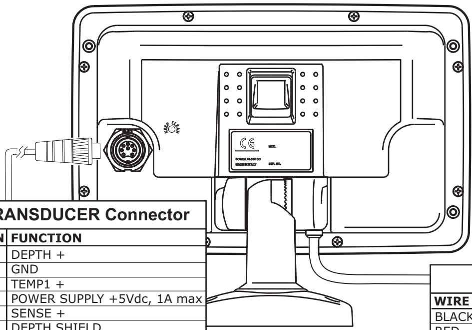


INSTALLATION AND REMOVING



Flush mount and Bracket installation

EXTERNAL WIRING



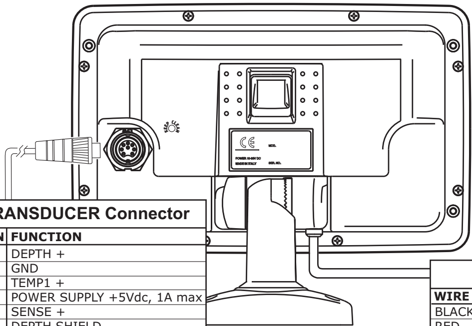
TRANSDUCER Connector

PIN	FUNCTION
1	DEPTH +
2	GND
3	TEMP1 +
4	POWER SUPPLY +5Vdc, 1A max
5	SENSE +
6	DEPTH SHIELD
7	DEPTH -
8	SPEED +

QUICK DISCONNECT BRACKET CABLE

WIRE COLOR	DESCRIPTION	FUNCTION
BLACK	GND/COMMON	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	NMEA0183/C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	NMEA0183/180/180CDX/C-COM
BROWN	NC	
GRAY	NC	
ORANGE	INPUT3+	NMEA0183/C-COM
PINK	OUTPUT3+	NMEA0183/180/180CDX/C-COM
BLUE	SIGNAL RETURN-	SIGNAL RETURN

External Connection for ***CM PRO***



TRANSDUCER Connector

PIN	FUNCTION
1	DEPTH +
2	GND
3	TEMP1 +
4	POWER SUPPLY +5Vdc, 1A max
5	SENSE +
6	DEPTH SHIELD
7	DEPTH -
8	SPEED +

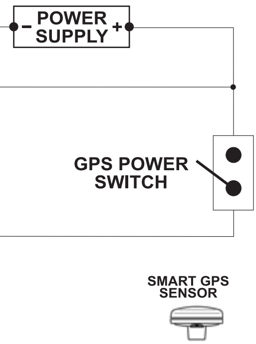
QUICK DISCONNECT BRACKET CABLE

WIRE COLOR	DESCRIPTION	FUNCTION
BLACK	GND/COMMON	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	NMEA0183/C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	NMEA0183/180/180CDX/C-COM
BROWN	NC	
GRAY	NC	
ORANGE	NC	
PINK	NC	
BLUE	SIGNAL RETURN-	SIGNAL RETURN

External Connection for ***CM iPRO***

TYPICAL CONNECTIONS

QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	**DESCRIPTION**	**FUNCTION**
BLACK	GND/COMMON	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	NMEA0183/C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	NMEA0183/180/180CDX/C-COM
BROWN	NC	
GRAY	NC	
ORANGE	INPUT3+	NMEA0183/C-COM
PINK	OUTPUT3+	NMEA0183/180/180CDX/C-COM
BLUE	SIGNAL RETURN-	SIGNAL RETURN



SMART GPS SENSOR CABLE	
WIRE COLOR	**FUNCTION**
RED	POWER +10-35 Vdc
BROWN	GPS NMEA0183 OUTPUT+
GREEN	GPS NMEA0183 INPUT+
BLACK/YELLOW/SHIELD	GND/SIGNAL RETURN

*GPS Connection on Port 3 for **CM PRO***

QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	**DESCRIPTION**	**FUNCTION**
BLACK	POWER GND	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	NMEA0183/C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	NMEA0183/180/180CDX/C-COM
BROWN	NC	
GRAY	NC	
ORANGE	INPUT3+	NMEA0183/C-COM
PINK	OUTPUT3+	NMEA0183/180/180CDX/C-COM
BLUE	SIGNAL RETURN-	SIGNAL RETURN

AUTOPILOT DEVICE
FUNCTION
NMEA0183/180/180CDX/INPUT+
SIGNAL RETURN

*Autopilot Connection on Port 1 for **CM PRO***

QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	**DESCRIPTION**	**FUNCTION**
BLACK	POWER GND	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	NMEA0183/C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	NMEA0183/180/180CDX/C-COM
BROWN	NC	
GRAY	NC	
ORANGE	NC	
PINK	NC	
BLUE	SIGNAL RETURN-	SIGNAL RETURN

AUTOPILOT DEVICE
FUNCTION
NMEA0183/180/180CDX/INPUT+
SIGNAL RETURN

*Autopilot Connection on Port 1 for **CM iPRO***

QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	**DESCRIPTION**	**FUNCTION**
BLACK	POWER GND	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	NMEA0183/C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	NMEA0183/180/180CDX/C-COM
BROWN	NC	
GRAY	NC	
ORANGE	INPUT3+	NMEA0183/C-COM
PINK	OUTPUT3+	NMEA0183/180/180CDX/C-COM
BLUE	SIGNAL RETURN-	SIGNAL RETURN

NMEA0183 DEVICE
FUNCTION
NMEA0183 OUTPUT+
NMEA0183 INPUT+
SIGNAL RETURN

External NMEA Connection on Port 1 for ***CM PRO***

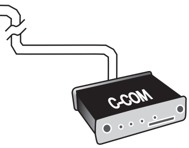
QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	**DESCRIPTION**	**FUNCTION**
BLACK	POWER GND	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	NMEA0183/C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	NMEA0183/180/180CDX/C-COM
BROWN	NC	
GRAY	NC	
ORANGE	NC	
PINK	NC	
BLUE	SIGNAL RETURN-	SIGNAL RETURN

NMEA0183 DEVICE
FUNCTION
NMEA0183 OUTPUT+
NMEA0183 INPUT+
SIGNAL RETURN

External NMEA Connection on Port 1 for ***CM iPRO***

QUICK DISCONNECT BRACKET CABLE		
WIRE COLOR	**DESCRIPTION**	**FUNCTION**
BLACK	POWER GND	POWER SUPPLY GND
RED	POWER +10-35Vdc	POWER SUPPLY+
WHITE	INPUT1+	C-COM
GREEN	SIGNAL RETURN-	SIGNAL RETURN
YELLOW	OUTPUT1+	C-COM

C-COM GSM Plus CABLE	
WIRE COLOR	**FUNCTION**
BLACK	GND
RED	POWER SUPPLY+
WHITE	C-COM TX+
GREEN	C-COM TX-
YELLOW	C-COM RX+

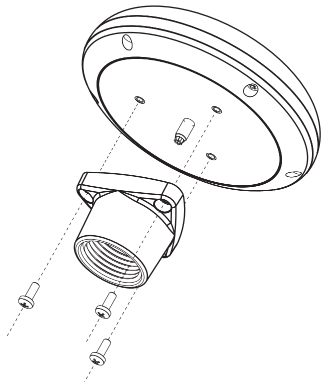


C-COM Connection on Port 1

Installing the External Smart GPS

CM 169CS/CM PRO

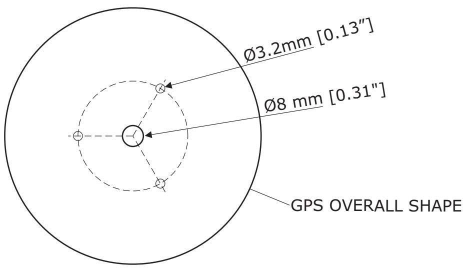
Choose a location for the antenna that has a clear view of the sky. Ensure there are no major obstructions or fixtures in the immediate proximity to the antenna. The antenna relies on direct "line of sight" satellite reception. If you are unsure that the chosen location is suitable it may be advisable to mount the antenna in a temporary manner to verify its correct operation. The thread used on the antenna (1", 14 TPI) is an industry standard thread used on a wide range of mounting brackets, including the swivel joints commonly used for angled surfaces. However due to the manufacturing process of these mounting brackets you may see that there is some slop when tightening down the antenna to the bracket. This is of no concern however as the antenna must be tightened until the antenna stops rotating on the antenna mounting bracket.



Installing GPS Antenna (I)

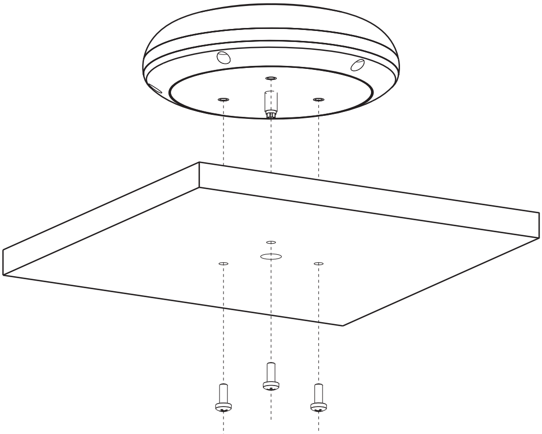
The antenna design also allows an easy flush mounting.

1. Apply the adhesive mounting template sheet in the area that was verified to receive satellite signal well
2. Then, following template instruction, drill a 0.31" (8mm) hole and three 0.13" (3.2mm) holes



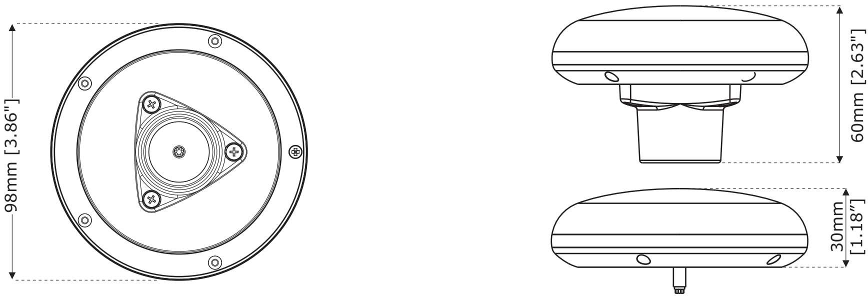
Installing GPS Antenna (II)

3. Remove the template and let the cable go through the central hole
4. Apply a small coat of RTV to the underside of the antenna
5. Place the antenna and then screw it with the three M3 screws



Installing GPS Antenna (III)

Dimensions



GPS Antenna Dimensions

Analytical Index